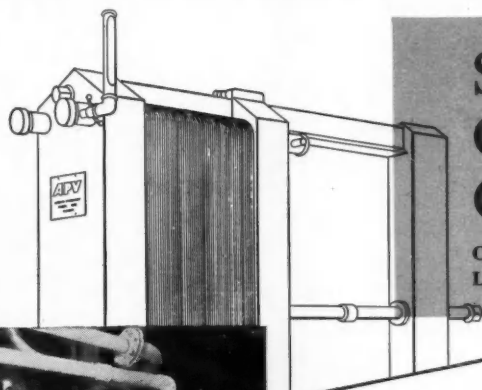


THE Chemical Age

VOL. LXXI

23 OCTOBER 1954

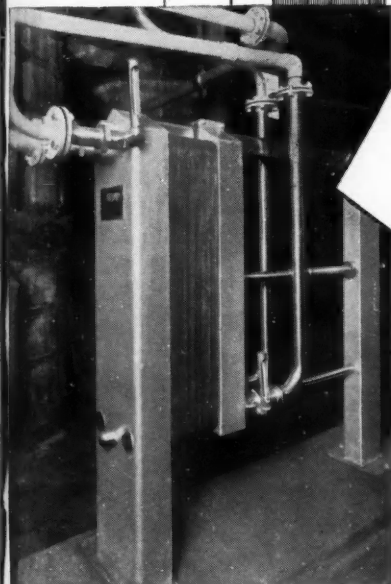
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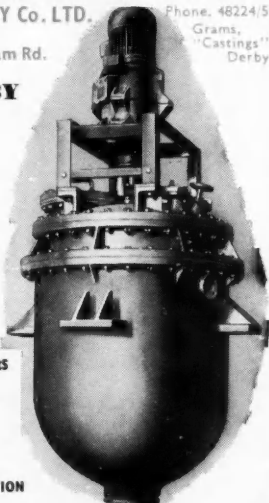
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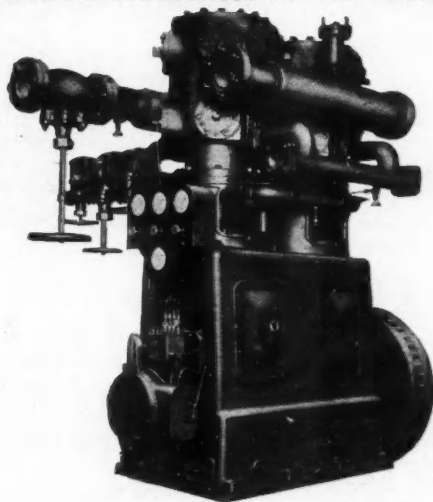
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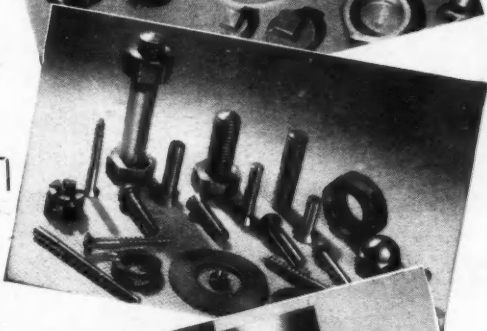
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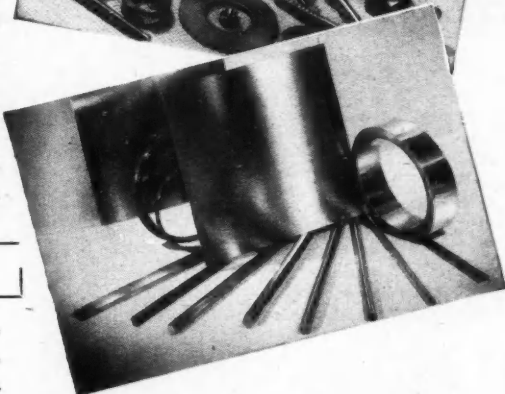
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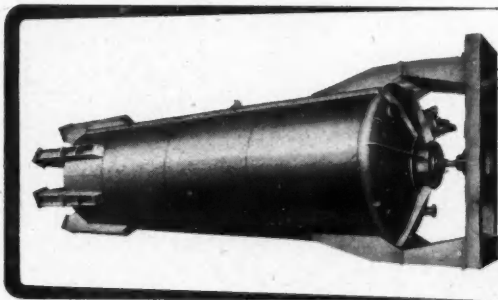


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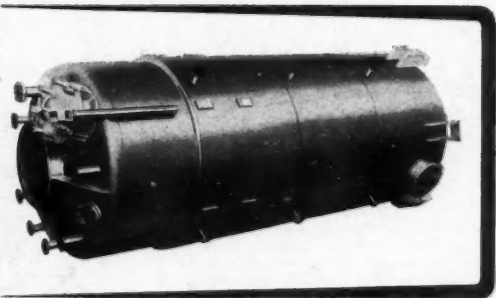
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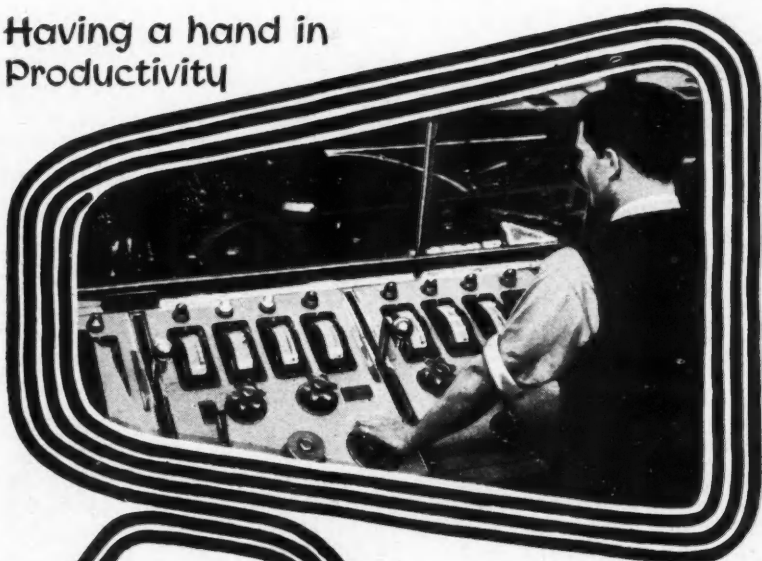
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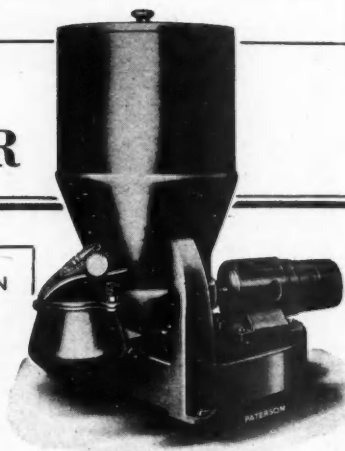
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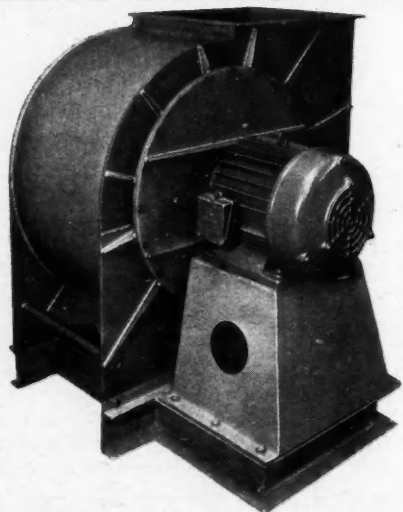
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Strikes

THE day before these words were written one of the London evening newspaper posters carried a terse but effective statement, 'Strikes—Latest.' Even this comment would have been stillborn a few days earlier when for the first time since 1926 London-based national newspapers were unable to appear because of a brief printing strike. Suddenly—and at a time of high activity and recovered national prosperity—a wave of strikes has arisen. By the time these words reach the printed page this strike situation may have been much improved or it may have worsened; all that we know as we try to analyse this regrettable turn in British industrial life is that the London docks strike seems likely to spread to other large ports.

The blow and its damage would be sufficiently serious confined to London alone. London is the largest port in the world and it is estimated that something like a third of British exports pass through London's docks on their way to overseas customers. London is also the world's largest commercial centre in addition to being a great industrial city; when the normally congested transport facilities for office workers are flung into chaos, the efficiency of commerce is inevitably reduced.

The right to strike, to withhold labour because the rewards or conditions of working are not satisfactory, is a device of democratic liberty. In essence, it is a militant stratagem of collective bargaining. Under war conditions it is possible to take away the right to strike, not by arbitrary dictatorship but with the genuine support of a substantial majority of public opinion. In peacetime this is hardly possible; and it is surely becoming evident to most people that the post-war

distinction between an 'official' and an 'unofficial' strike is thinly theoretical insofar as the practical effects upon the life of the community are concerned.

Both the docks and the bus strike have been described as 'unofficial.' That is to say, they are strikes which have not been sanctioned or organised by all the major unions to which the affected workers belong, but this makes little difference to cargoes of exports which remain at the dockside or to cargoes of imports left on the water—and it offers no consolation to London workers whose journeyings to and from offices or factories have been made so much more cumbersome.

We do not wish to indulge in comments that could possibly aggravate industrial relations, but we cannot help wondering if we are alone in the opinion that the time has come to discard this somewhat unrealistic term, the 'unofficial strike.' If a strike becomes big enough, it is a plain 'strike.' If thousands of workers take part in it, albeit 'unofficially,' this is surely clear-cut evidence that a state of grievance exists.

Time should not be lost in applying measures of conciliation simply because a large strike is still classified as 'unofficial.' Strikes are rarely 100 per cent logical. Mass meetings cannot be kept free from the effects of emotionalism. Influences other than the specific grievance tend to make themselves felt. The present custom of ignoring an unofficial strike until its size has made the distinction meaningless seems more and more difficult to justify. The period during which impartial third-party conciliation efforts are not made allows the atmosphere of unrest to spread and deepen. It is not

generally considered sound policy to see whether a fire spreads through a warehouse before sending for the fire brigade.

Admittedly, there are a number of local disputes, minor strikes or risks of strikes that affect only one unit in an industry, and these can be sensibly classified as 'unofficial'; more often than not, the intervention of the major union can achieve speedy settlement in such cases. However, it should not need great experience or rare industrial acumen to distinguish at a very early stage between the unofficial strike likely to respond to local treatment and the kind likely to spread dangerously. The consequences of faulty diagnosis when the workers involved are part of the national system of services upon which industry as a whole depends are far too serious for 'wait-and-see' risks to be taken.

There will be some who interpret this opinion as a policy of weakness. Such a viewpoint is out-of-date. It is not necessarily a sign of strength to ignore causes of unrest or dispute in the hope that they will be accepted as a natural part of the industrial pattern. Even minor dissatisfactions can grow by fermentation into major grievances.

It is one of the tasks of our age to learn how to maintain good relationships between management and labour against a background of full employment. The causes of current disputes are totally different from the causes of strikes 20 or 25 years ago. The recent newspaper printing strike was due to a dispute between two unions over details of union administration. The London bus strike was apparently due to the workers' demand that overtime shall be regarded as voluntary and not virtually as a compulsory obligation. The docks strike has a similar cause but it would not seem to be the only factor contributing to unrest.

Is it entirely an accident of fate that almost all these major industrial disputes since the war have occurred in the nationalised or corporation-run industries? The official unions, having long sought nationalisation, are torn between their old responsibilities of representing workers' interests and their new spiritual responsibilities of proving that nationalisation can usher in an industrial paradise.

Management has become part of a

gigantic system, operating cog-by-cog without room for flexibility and freedom of managerial decision. In the industrial units still owned and run by private enterprise, it seems far easier and simpler for grievances to be discussed before they have grown into hard disputes. The men who can take decisions are not as remote; at worst, the explanations why some cause of dissatisfaction cannot be speedily corrected can be given without undue delay.

During the war Lord Beveridge (then Sir William) not only made a report to the Government on Social Insurance, but he made a personal report on 'Full Employment in a Free Society,' published as a book. He foresaw the full danger of disputes and strikes in an industrial community newly released from the whip of unemployment. 'So long as freedom of collective bargaining is maintained, the primary responsibility of preventing a full employment policy from coming to grief in a vicious spiral of wages and prices will rest upon those who conduct the bargaining on behalf of labour . . . But both the State and the managers of business have their part to play . . . The part of business managers lies in accepting the need for making 'available to others than themselves full information as to the financial condition of industry. Wages ought to be determined by reason, not by the methods of strike and lock-out, anachronisms as indefensible as ordeal by battle. They should give place to reason, *but reason cannot work in practical affairs with facts* . . .'

Disputes that centre upon the amount of overtime expected each week may not be precise examples of wage-grievance disputes, but full employment has generated a natural sensitivity about working conditions. Is the factual background made sufficiently clear in the early stages of discussion? Do those who 'conduct the bargaining on behalf of labour' make it sufficiently clear to management that the grievances are strongly felt, or is management in any case too remote, too centrally situated? These are questions to be asked about nationalised industry today. They do not seem to be questions of such necessity or urgency in the section of industry which is still privately owned.

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Notes & Comments

Any Questions?

THE announcement made some days ago by the Treasury extending security checking outside the atomic field from 3,000 to 10,000 civil servants will not be cheerfully or complacently received by many scientists. It is true that the word 'scientist' does not occur in the official statement, but there is little doubt that the scientific civil servant is most affected. Enquiries which reach into private lives and personal views have always been distasteful in Britain; so, too, has been any system of judgment that reaches its verdict secretly and without right of defence or appeal. Security screening, however fairly it may be done, crosses these borderlines. It is known, for example, that the families and neighbours of high-level consultants in the atomic field are being questioned (see *Daily Telegraph*, 9 October, 1954). In an age when national security rests more than ever before upon technical armoury, the State's case for special security measures is certainly strong. Furthermore, it is a case in which the views of allied nations must be considered, for the interchange of new technical information is restricted if one ally lacks confidence in the security measures of another. The real problem at issue is not whether there should be any security checking, but to determine how much of it there must be and where it should stop.

Danger

NO doubt we must accept security checking as an unpalatable symptom of the world's present ailment—international fear and suspicion. But the professional organisations of both scientists and civil servants must keep the closest possible watch upon its extension and operation, and any evidence that an individual has been unjustifiably penalised or excessively investigated should be brought into the daylight of public knowledge. There is no other safety-valve; for infinite secrecy, like infinite power, must in the end bring infinite corruption. Nor would an excess of

security checking be at fault for ethical reasons alone. It would drive all men of exceptional ability into fields outside the area of personal investigations.

Untapped HEP

A RECENT communication to *Nature* (1954, 174, 660) describes 'an untapped source of power which has been unmentioned in the literature.' The discussion is not merely theoretical, for a power-yielding unit which has run satisfactorily for three months at the Chemical Research Laboratory is also described. When a pure solvent mixes irreversibly with a much larger volume of a solution, free energy is lost. This amount of free energy is calculable as PV where P is the osmotic pressure of the solution and V is the volume of the pure solvent. Such a condition occurs whenever a river mixes with sea-water. The osmotic pressure of sea-water is some 20 atmospheres, and from this fact the writer deduces that free energy equal to that obtainable from a 680 ft. waterfall is lost at sea-river meeting-points. At the CRL a pile of synthetic ion-exchange membranes has been constructed of 47 acidic and 47 basic polythene membranes alternately. Fresh and salt water (in fact, tap water and N/2 sodium chloride solution) pass through the alternate spaces between the membranes, and a continuous supply of current has been obtained. The pile has an internal resistance of about 250 ohms at 10° C. At higher temperatures the resistance is less, and for that reason this simple source of power is likely to be more economic if operated in warm climates. The main running cost factor would seem to be the time such a pile could operate without interruption to replace the membranes or to clean out the interior. As a recent American report has shown (*Chemical Engineering*, 1954, 61, [10], 161), ion exchange processes have a far more diverse future than most chemists yet appreciate, but the production of power seems to be one of the possibilities not previously listed by ion exchange enthusiasts.

IN THE EDITOR'S POST

Chemical Engineers

SIR,—In your issue of 9 October you deal editorially with the increase of the chemical engineering profession in this country. You also compare the employment of chemical engineers here and in the US in various types of duties and you infer that because 20.2 per cent of chemical engineers are in administrative positions in the UK and only 10.5 per cent in the US, that therefore the British chemical engineer makes 'an outstandingly impressive contribution' while the American chemical engineer contributes presumably less.

There is often a risk of misinterpreting statistics based on percentages, rather than on actual figures. I would suggest that there is a different explanation for the relatively lower American percentage figure, from the interpretation given to it by you. Because there are more chemical engineers in the US than here and because the term 'chemical engineer' is used more loosely there, the proportion of chemical engineers who are not in administration to those in administrative positions is greater in the US than in the UK. This proportion is further magnified by the fact that the American industrial pattern favours fewer but large enterprises while in the UK there is a relatively large number of small firms. In a small firm the chemical engineer in the administrative position might be the only one, or one amongst very few chemical engineers employed.

To obtain a truer comparison of the contribution made by the chemical engineer in the administration of British and American industry respectively, one would have to know the percentage of administrative positions held by chemical engineers, out of the total of all administrative positions existing in the industry in each country; and one would have to determine the power these chemical engineers wield in terms of the proportion of capital investment, turnover, or other convenient yardstick, which they control.

Yours faithfully,

M. K. SCHWITZER.

Chemical Division,
Armour & Co. Ltd., London.

Cat Cracker Goes on Stream

HEAD Wrightson Processes announce that, in conjunction with the Houdry Process Corporation and World Commerce Corporation of New York, work has finished on a 3,600 barrels per day Houdriflow catalytic cracking unit, which has now gone on stream at the Antwerp refinery of Albatross SA Belge pour le Raffinage de Petrole.

The new Houdriflow represents an important part of the current expansion and modernisation of Albatross' Antwerp refinery. The cat cracker will produce high octane petrol, which will be marketed domestically.

The Albatross refinery began operations in 1935; it was badly damaged during hostilities and remained inactive throughout the war. The former installations were reconstructed in 1948.

Last year construction was begun on a new crude unit, feed preparation unit, Houdriflow cat cracker, gas recovery and stabilisation unit, plant for the polymerisation of light olefines produced in Houdriflow cracking operations, and new facilities for treating straight-run and catalytic petrols.

The refinery is designed to process 10,000 barrels per day of Persian Gulf crude, and ultimate expansion to 15,000 barrels per day is planned. Petro-Carbon Limited, Manchester, acted as consultants.

Scots Engineers Group

THE proposals mooted at the end of last season for the creation in Scotland of a Scottish group of the Institution of Chemical Engineers have now been implemented. First meeting will be held at Edinburgh on 26 October when Professor D. M. Newitt, Courtauld's Professor of Chemical Engineering, University of London, will speak on 'The Measurement of High Pressure.'

Behind this first gathering lies a period of some 15 years of endeavour. The tremendous growth of engineering technology as applied to chemical processes in Scotland—and perhaps most of all the growth of Grangemouth as a chemical engineering industry centre—made the ultimate formation of such a group inevitable. There are about 120 members of all grades throughout Scotland, and of these about 60 attended the meeting at which the decision was taken.

ABCM Appoints Work Study Officer

Chairman Stresses Need for Increasing Productivity

AT the annual general meeting of the Association of British Chemical Manufacturers held in London on Thursday 14 October, the chairman, Mr. W. J. Worboys, announced that a work study officer had been appointed to the staff and would be commencing his duties shortly. This follows the setting up, last February, of a Work Study Advisory Committee under the chairmanship of Dr. D. E. Wheeler to stimulate and encourage the application of work study in the chemical industry.

In presenting the 38th annual report for the year ending 30 June, Mr. Worboys said:—

That attention should be given to work study was one of the recommendations of the Heavy Chemicals Productivity Team which visited the US in 1952. In his report to you last year, my predecessor, Sir Graham Hayman, told you that a central steering committee and six area committees had been set up to stimulate and advise member firms in the implementation of the team's recommendations. During the year under review, the steering and area committees have been very busy. Liaison contacts have been appointed by our members for their works in each area. The majority of these have already attended area meetings and have discussed the progress they are making and the problems that have arisen in the implementation of the main recommendations in the report.

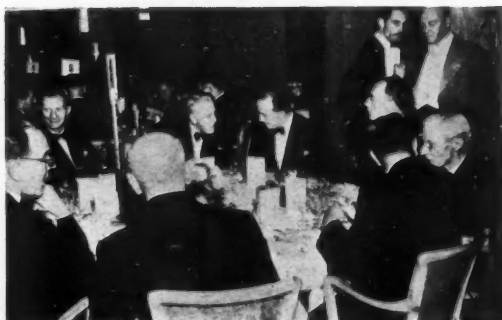
In order that all interested parties may be kept fully informed of what is being done,

we have started a new publication called 'Productivity News'. Three issues have already been made, namely, in May, July and August, and a fourth has gone out this week. The circulation is already well over 500. . . . There is no limit to the number of copies for which firms may ask and I hope they will take full advantage of this in order to ensure that the information is passed down to all members of their staff who require it.

But I would stress the point that these various committees can give their maximum service to the industry only if the higher management of individual firms is convinced of the importance of the work and submits its problems to the association. In addition to the committees, many firms have expressed their willingness to help their colleagues with their productivity problems and much has already been done in this 'mutual aid' field.

Members who do not consider themselves as being in the heavy chemical field have, in the main, abstained from participation in these productivity activities. I would, however, like strongly to suggest that they would find it very useful in their drive for productivity if they were to study the recommendations in the Heavy Chemical Team's Report, most of which is applicable to all branches of chemical industry, and to make use of the services and machinery which the association has created.

The report tells you what the association is doing and proposes to do in close co-



The chairman's table at the annual dinner. Visible from left to right are Prof. W. Wardlaw, Mr. Tom Williamson, Dr. Alexander Fleck, the Rt. Hon. Peter Thorneycroft, Mr. W. J. Worboys, and Dr. E. D. Adrian

operation with the Federation of British Industries in the field of trade effluents. The problems are complex and urgent. The legal position in all its aspects is well described in the recently issued booklet of the FBI on 'The Disposal of Waste Waters from Industrial Premises'. The powers conferred on the River Boards by the Rivers (Prevention of Pollution) Act, 1951, are very far reaching and it does not follow that a firm will be allowed to continue the methods of disposal it has used in the past. In fact, the position may well become such that nothing obnoxious or in any way detrimental to animal or plant life can be discharged from the factory. Members are urged, where they are not already doing so, to study their problem from this angle and to have a solution ready ahead of the need arising. The association is appointing a technical assistant to assist our Trade Effluents Committee to deal with the numerous problems of the chemical industry and, in particular, to handle the pooling of information for the benefit of the industry at large.

Safety Pioneers

This association has always played a pioneering part in the promotion of safety. Its Quarterly Safety Summary and its Safety Circulars receive a very wide distribution both inside and outside the industry and Government Departments take a large number for the use of their staffs. The present circulation is over 1,600. The booklet on 'Marking Containers' represents a new development which should do much to improve the safe transport and handling of chemical products. It is hoped that all firms will apply its recommendations.

I am glad to tell you that there has been an unprecedented interest in the safety conference which has been arranged for the beginning of November. The proposed visits to Billingham and Wilton to see safety methods in actual operation have made a special appeal to members, and following on the preliminary announcement in April, all the 400 available places have been booked for some time.

Progress has been made on the controversial subject of exhibitions, and the part they should play in the general publicity effort of the industry. The Publicity Committee has submitted its report to Council, which has accepted its findings. These, briefly, are that the industry should become

re-associated with BIF in London at intervals of two years and under conditions which, I believe, will prove both more attractive and much less expensive to exhibitors than has been the experience in the past.

Two legislative measures which have stimulated the development of the chemical industry, particularly on the organic side, are the Dyestuffs Act and the Key Industry Duties which have now been in operation some 33 years. The future of the Dyestuffs Act is affected by the implications of GATT (the General Agreement on Trade and Tariffs). We have argued the case for its continuation forcibly with the President of the Board of Trade and we have received the full support of the Colour Users' Association. We are now awaiting the outcome of our joint representations.

As regards Key Industry Duties, these have been continued for five years as from August, 1954. We have, however, a serious obligation to ensure that we make full use of this protection in order to develop the manufacture in this country of those fine chemicals which have still to be imported in substantial amounts for the use of British industry.

The chemical industry continues to make a substantial contribution to the country's export trade. Exports of chemicals as covered by Class III, Group O, of the old export list amounted to £130,000,000 in 1953, a drop of 6 per cent as compared with 1952. Notwithstanding this fall, the industry had direct exports in 1953 representing approximately 29 per cent of its total production.

A Fine Achievement

For the first eight months of this year our exports, as covered by Class D, Division 1, of the new export list, were valued at over £134,000,000 as compared with £115,000,000 for the same period of 1953, an increase of nearly 17 per cent. These 1954 exports represent 7½ per cent of the total UK exports, a very fine achievement, and if indirect exports are taken into account the figure is, of course, considerably higher.

I had hoped to be able to make a statement in regard to the recommendations in the Cremer Report on Chemical Engineering Research, but the study of the problem which we have been making in co-operation

Sharing a joke together: the Rt. Hon. Peter Thorneycroft, Mr. J. Davidson Pratt, Sir Frank Lee and Mr. W. J. Worboys



with the British Chemical Plant Manufacturers' Association has proved exceptionally difficult. It would, perhaps, have been relatively easy for us to recommend the establishment of a research association of the normal DSIR pattern, but we were not convinced that this was necessarily the right

method for chemical engineering. The subject is still being actively studied. We have told the DSIR and Mr. Cremer of the trend of our deliberations and we hope that in the not too distant future we may have something concrete to place before Council and members at large.

The Annual Dinner

IN welcoming guests at the annual dinner which was held at the Grosvenor House Hotel on the evening of 13 October, Mr. Worboys said:—

The British chemical industry is accustomed to breaking records and tonight we have broken still another. I am credibly informed that, sitting at this dinner this evening, we number 1015 and that, by a goodly margin, is more than ever before.

I had hoped to welcome here this evening the chairman of the Manufacturing Chemists' Association of America, this being our sister body in the States, but unfortunately it is not possible for him to come. I hope we will be more fortunate next year. In less than four weeks I am to be the guest of the Manufacturing Chemists' Association at their semi-annual dinner, and I am sure it would be your wish that I should take to them your greetings.

Since 1948 the British chemical industry has expanded at about twice the rate of expansion of British manufacturing industry as a whole. During this period an additional £265,000,000 has been invested in the chemical industry, this being approximately 12 per cent of the total new investment in British manufacturing indus-

try during this period. In 1953 the chemical industry exported 29 per cent of its total production, and in the first seven months of 1954 chemical exports showed an increase of 16 per cent over the corresponding period for 1953, as compared with an increase of only 11 per cent for manufacturing industry as a whole.

And, as an augury for the future, may I remind you that the chemical industry's expenditure on research and development in 1952 was over £11,000,000, an increase of 32 per cent on 1948, and that, furthermore, schemes were then in hand substantially to increase research and development work. These schemes involved capital expenditure of more than £6,000,000 and, when completed, will cause the annual expenditure by the chemical industry on research and development to rise to nearly £13,000,000, an increase of approximately 50 per cent on expenditure in 1948.

This is an impressive record and one of which we can be justly proud. We must not, however, be too cock-a-hoop. Chemical science and chemical manufacturing technology are expanding rapidly and, if our figures for the last five or six years had not been as good as those I have quoted, our industry would have been open to criticism.

Chemical knowledge is still growing apace and it must be our objective to show even better figures for the next half decade. To paraphrase something which the Red Queen said to Alice in *Looking Glass Land*: 'These are fast times in which we live; one must run fast to stay in the same place and one must run very fast indeed to get anywhere.'

Although the American chemical industry is, of course, much larger than the British—five to seven times, using our definition—it bears, however, approximately the same proportion to the whole of the American manufacturing industry as the British chemical industry does to the whole of British manufacturing industry. Bearing in mind this relative size of the British and American chemical industries, we can say that the British chemical industry's annual expenditure on research and development and our annual capital investment compare favourably with the American figures.

During recent years, the association has extended its technical services substantially, and this is particularly notable in the field of productivity and work study. This work started with the Report of the Heavy Chemical Productivity Team, and the Area Committees and the Central Steering Committee, which were set up to put into practice the team's recommendations, have made a good start with their work. Also, the Work Study Advisory Committee, which Council set up after last year's very successful conference at Buxton, has made a good start with its work; a full-time officer has been appointed, and the committee's first report came on to my desk yesterday afternoon.

Firms Must Adopt Methods

I feel, however, gentlemen, that excellent though the work of these committees is, little real benefit will result unless the top management of member firms realises that good will come—and I mean good for their firms—from the adoption of the steps and methods suggested by these committees. I don't think that top management generally is at present so convinced, and many, I am sure, are inclined to say: 'Oh, yes, these things are all right for the big firms but they don't apply to me.' Nothing could be more incorrect.

Another subject that I should like you all to think about is whether or not we would not all benefit materially if we could arrange for more interchange of experience

between member firms. I believe that this could be done without serious risk of disclosure of confidential information and I believe if we did so exchange experience that we each would benefit and that the rate of development of our industry could be speeded up. I have heard it said—and I can well understand it—'Yes, I would like to visit so and so's works but I would not like to ask him back.' Perhaps that attitude was more appropriate to other times and these days living a little dangerously would pay handsome dividends.

National Exhibitions

You will remember that in his speech last year Sir Graham Hayman talked about national exhibitions, a subject which has vexed our industry for some time. The committees, which Sir Graham told you were then sitting, have reported to Council, and their recommendation is that the chemical industry should re-associate itself with the British Industries Fair at Olympia, which you will recall is under new management, probably on a biennial rather than an annual basis. This recommendation, which, of course, covers other detailed points, is at present being considered by Council and, if accepted, it is probable that our first exhibition would be in 1956. It is important that, if we do exhibit in 1956, the exhibition should be one of a type and size consistent with the size and dignity of our industry, and Council are under no illusions about the magnitude of the task ahead of them to ensure this. I know that this question of exhibitions is a very difficult one, but I hope you will not mind if I say to you that I think we, as a nation, are rather allergic to publicity and that we in the chemical industry are even more allergic. We cannot, on the one hand, complain if buyers of chemicals in overseas markets say they buy their chemicals from Germany because they know the German chemical industry is good and, on the other hand, refuse to publicise and demonstrate the excellence of our own products and the wide spread of our own chemical industry. A periodic national exhibition is one way of doing this, and I suggest that we should not try to measure the worthwhileness of such an exhibition by short-term sales results.

Before presenting our chief guest to you, I should like to mention to him one thing which I think is of great importance, about which I think he and his colleagues might

do something. It concerns taxation. I do not want to dilate on the present high level of the standard rate of personal taxation—a matter which rightly attracts much heavier steel than mine and of which the President must have both personal and public knowledge. Nor do I want to talk about corporate taxation; it also is too high, but, although no expert, I believe that corporate taxation in the United Kingdom is not appreciably higher than it is, for example, in the US and in Germany.

We have been talking this evening about some of the factors that affect the health of industry—the national wealth producer. Last Saturday, at Blackpool, the Prime Minister, speaking of the same things, emphasised the importance of 'exceptional enterprise, diligence, exertion, invention and skill.' He referred to 'differentials' and he defined these as the rewards for extra skill, responsibility and effort. He described 'differentials' as 'one of the keys to progress'. My plea to you, sir, and to your colleagues, is that, when thinking of 'differentials', you give proper acknowledgement to the part played by middle and top management. We are constantly told that management has great responsibilities, as indeed it has, but with our present oppressive surtax rates it is impossible to reward young men for incentive, invention and growing responsibility. Indeed, it is becoming more and more common to encounter cases where promising young men decline promotion and increased responsibility. Industry can run moderately well with moderate skill and energy but for real success there must be a bubbling enthusiasm through the depth of each organisation, and it is quite unintelligent and starry-eyed to assume that this

bubbling enthusiasm can be achieved without reward. And bubbling enthusiasm is even more important in a rapidly expanding and internationally competitive industry such as the chemical industry.

Replying, the President of the Board of Trade, the Rt. Hon. Peter Thorneycroft, spoke of the fame of the chemical industry, saying that no other industry had done so much in such a short time to change the world. Continuing, he said:—

Forty years ago you were barely an industry. Today you are the foundation of most other industries. The first world war blew open the door of the chemical age. World production of chemicals went up sixteen-fold in four decades. In this forward rush you have scrubbed the modern world with detergents, doctored it with synthetic drugs, dressed it in synthetic textiles, adorned it with plastics and blown up parts of it with TNT.

There is one very pressing event plain for all to see, that is, increasing foreign competition. It is illustrated by what is happening in the United States of America and Germany. Even in 1954 when United States investment is expected to be down by 12 per cent, the United States chemical industry expects to put £500,000,000 into expansion and their expenditure on chemical research is six times that of our own. Even allowing for differences of population this expansion is clearly a challenge.

There is no lesser challenge nearer home. Since 1950, the German and some other West European chemical industries have expanded more than ours. The German comeback to world markets is a serious challenge and German chemical exports are catching up our lead. I know that simple



Another view of the chairman's table: Sir Frank Lee, Sir William Ogg, Prof. W. Wardlaw and Sir Harold Hartley

comparisons can be misleading and not least misleading in chemicals. It is hard in fact to define the chemical industry. But the facts I have stated illustrate that the sheer volume of output with which our industry must compete is formidable and is growing.

Last month in Washington and this past week in London, we have been discussing with the Commonwealth detailed questions connected with GATT in preparation for the review which starts in Geneva next month. We have been fortified by their advice. We have been fortified by the advice of various trade associations, and though the advice may differ a little here and there in emphasis, its general tenor is clear. It coincides with our view that we should continue to support the agreement and that we should refrain from any attack upon it or upon its general principles.

Our policy of wider trade and payments has been notably expounded by the Chancellor of the Exchequer. How fast and how far we can go depends upon many factors. It depends on you; upon how far British industry keeps its lead and maintains its competitive efficiency; upon how far we are capable of fighting for and winning and holding markets. All I hear and see of the chemical industry inclines me to give an optimistic answer in your case, but how far we go depends upon other factors too. It depends on how far other great industrial nations are prepared to co-operate. We cannot pursue multilateral trade alone. We cannot accept the risks and inconveniences of non-discrimination if others do not reciprocate.

Much depends on the attitude of the United States. I do not share many of the criticisms that are made of that great country. The Americans have played their part nobly in the post-war world. But great decisions face them now. Will they or will they not go forward with liberal trade policies? It is in their interests as well as ours that they should do so.

When the last word has been said about the Government's attitude to commerce, the final answer must remain with you. It is, after all, your industry not mine. I hope that you will do your best to see that things stay that way. It is for you to determine its competitive efficiency and not for me. The most that I can do is to clear a path along which you can have a chance to reach the goals which lie ahead of us. I think we

should try to do these things together. It is important to maintain touch between the board rooms and the Board of Trade. We are in a world of freedom and friendly contact. We need to know how you stand and what your prospects are. You want to know the kind of things we are likely to do next and, sometimes, no doubt, we'll disappoint each other but we'll lose nothing by mutual understanding.

Election of Officers

The elections at the annual general meeting of the Association of British Chemical Manufacturers resulted in the following constitution for the Council for 1954-55: *President*, SIR HARRY JEPHCOTT; *Vice-presidents*, DR. F. H. CARR, C.B.E., SIR ROGER DUNCALFE, DR. E. V. EVANS, O.B.E., SIR GRAHAM HAYMAN, MR. C. F. MERRIAM, M.C., MR. L. P. O'BRIEN. *Chairman*, MR. W. J. WORBOYS; *Vice-chairman*, MR. G. F. WILLIAMS; *Honorary treasurer*, MR. J. L. HARVEY, M.B.E. *Elected members*: DR. A. E. EVEREST, MR. I. V. L. FERGUSON, MR. E. M. FRASER, C.B.E., DR. W. H. GARRETT, M.B.E., MR. J. C. HANBURY, MR. B. HICKSON, DR. W. G. HISCOCK, MR. G. E. HOWARD, MR. L. G. MATTHEWS, MR. F. G. PENTECOST, MR. H. V. POTTER, MR. C. R. PRITCHARD, MR. K. H. WILSON, O.B.E., *Co-opted members*, MR. B. A. BULL, MR. E. LE Q. HERBERT, MR. E. STEIN, MR. T. M. WILLCOX. *Honorary Vice-presidents*, MR. C. E. CAREY, MR. N. N. HOLDEN, LORD MCGOWAN, K.B.E.; *Director and Secretary*, MR. J. DAVIDSON PRATT, C.B.E., M.A., B.Sc., M.I.Chem.E., F.R.I.C.; *Manager*, MR. A. J. HOLDEN, B.Sc., F.R.I.C.

Freon Plant for Canada

A PLANT for the manufacture of Freon fluorinated hydrocarbons, gases which create the cooling action in air-conditioning and refrigeration systems and are the basic propellants in aerosols, will be erected immediately at Maitland, Ont., by Du Pont Co. of Canada Ltd.

The plant will be of sufficient capacity to fill all Canadian requirements for these chemicals, now largely imported from the United States, and will use Canadian base materials wherever possible. It is being built adjacent to Du Pont of Canada's nylon intermediates plant, which went into production a year ago.

Technology in Israel

Professor Heimann's Views

JUST ended a month's visit to this country is Professor H. Heimann, Dean of the Faculty of Chemical Engineering at the Technion, Israel Institute of Technology, Haifa. (See THE CHEMICAL AGE, 16 October, p. 844.) In an interview last week with our correspondent, he described recent technological developments in Israel.

The Technion has recently moved out of Haifa to Mt. Carmel, where a large 'campus' has been constructed. Total number of students at the moment is about 1,400, of whom some 220 are studying chemical engineering. The course is a four-year one, and is followed by postgraduate work on the English model, leading to a doctorate after a further three years. One of the motives of Professor Heimann's visit was to find possible licensees for processes developed in the course of research.

Israel's economy is based on agriculture, a fact of considerable importance to the chemical industry, and principal developments in this industry at the present time are either in fertilisers and other agricultural chemicals, or in building materials. As we have reported at various times in THE CHEMICAL AGE, there are important sources of potash and phosphates in the country, and a large ammonia and nitric acid plant is being erected at Haifa, with the co-operation of I.C.I. There are also considerable deposits of peat, and during his visit Professor Heimann discussed problems of organic fertilisers with Britain's experts on soil research at the Macaulay Institute, Rothamsted, and Jealott's Hill.

Plant growth control substances are being manufactured on a small scale in Israel, and there is a growing demand for insecticides. By-products from the citrus industry are finding increasing sales to the US, particularly substances for use in radiation protection, and phosphoryl derivatives of hesperidine, which are being tested as oral contraceptives.

As an indication of the growing industrialisation of Israel, Professor Heimann pointed out that in the last 18 years, consumption of electric power has increased 10 times, and of liquid fuel more than five times. Future development, he maintained, was dependent on the resumption of normal commercial interchange with other countries.

There are important deposits of copper, iron and manganese, although their value could not yet be judged. A large pilot plant for copper production is at present under construction.

Professor Heimann is now to visit Turkey, a country with whom Israel already has vital commercial relations.

Better Food Preservation

CARBIDE and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, has arranged for a non-exclusive license under the Best Foods Inc. patent (USP.2,379,294) covering the use of sorbic acid for control of mould growth.

Carbide and Carbon Chemicals Company is offering sorbic acid at \$2.45 per pound, which includes royalties to the patent owner. Use of sorbic acid at this price is practical because of the small amounts needed for effective mould control. It is anticipated that if the use of this antimycotic grows to the extent where a larger unit for production is needed, this will make lower prices possible.

Laboratory and commercial experience has demonstrated the value of sorbic acid for mould control. For example, sorbic acid has proved to be an effective antimycotic for certain cheese and cheese products. Reports indicate that the use of sorbic acid in the concentrations necessary for mould control does not affect flavour, odour, or colour.

Temporary permits have been granted by the United States Food and Drug Administration to a number of cheese manufacturers to use sorbic acid in certain standardised cheeses. Further experimental work is being done on other food uses of sorbic acid. For instance, indications are that the use of sorbic acid in brining cucumbers for pickles reduces the number of 'bloaters,' and should produce better quality pickles at lower cost. Experimental work on baked goods shows good promise for mould inhibition on bread, cakes, and packaged rolls. Extending the shelf-life of these products is a determining factor in effecting economies that can be passed on to the ultimate consumer. Sorbic acid is also being tested as a means for preventing spoilage of fresh fruits and vegetables, processed meats, syrups and a variety of other food products.

Purity Standards

TPF Study Group's First Report

IN March, 1953, the Council of the Toilet Preparations Federation appointed a study group, under the chairmanship of Col. J. K. L. Wenham, to inquire into the desirability of setting up standards of purity for raw materials used by the industry.

At a small luncheon party at the Café Royal on 6 October, when Mr. T. Lyddon Gardner, chairman of the Federation, presided, the first results of the first part of the group's deliberations were made available.

They covered mineral oil, glycerine, borax, boric acid, petrolatum, paraffin wax, beeswax, petroleum wax (micro crystalline), precipitated chalk, titanium dioxide, calcium stearate, talcum, propylene glycol, zinc oxide, magnesium carbonate, zinc stearate, magnesium stearate, triethanolamine and stearic acid (triple pressed grade).

Introducing the suggested standards, Col. Wenham mentioned some of the reasons which had prompted the task, including the loose phraseology of the amended Merchandise Marks Act; this left any manufacturer vulnerable to frivolous complaints which could lead to court action, and it was to be hoped that standards of purity for materials could be a good witness.

The proposed standards, he said, generally had the background of the British Pharmacopoeia and whenever there was a difference it was only in favour of being more realistic. He asked that the suppliers comment freely on the proposals; all the points made would be considered in detail by the study group. When their deliberations had been completed, the Federation would publish them.

Col. Wenham said that further standards for other materials would be issued from time to time in the future.

Expansion at Slough Works

I.C.I. Paints Division, who already employ 2,000 people at Slough, Bucks, have started a £1,500,000 expansion scheme at their Wexham Road works which will take three years to complete. Additional production capacity available at the works will enable many more people to be employed.

Part of the expansion includes modernising out-of-date features of the work and introducing the most modern methods of

mechanical handling,' said Dr. D. G. Hopkins, the joint managing director.

A start has already been made on a large expansion to the research and development laboratory, and Holland, Hannen & Cubitts Ltd., the contractors, have already many men engaged on the new building. The development plant provides for additional manufacturing and ancillary facilities needed to increase the output of paint. A new paint plant with many novel features will be installed and new equipment for the manufacture of synthetic resins used in Dulux paints. The scheme also includes a new finished products warehouse, stores for pigments and containers and additional workers' amenities.

Boom Conditions

SIMA Convention Takes Stock

THE rapid expansion of the industry in the last few years was stressed at the annual convention of the British Scientific Instrument Manufacturers' Association at Eastbourne from 15 to 17 October. It was also suggested that it was time that Government protection of the industry was done away with.

Mr. A. J. Philpot, director of SIMA, said the spirit of adventure had been paralysed by the 'featherbedding' of protection for 33 years. Protection, he said, hindered the industry from gaining the goodwill of other nations. It also fostered the untrue belief that German scientific instruments were better than British.

At the convention dinner, the president, Mr. C. E. T. Cridland, said that the attitude of the association's members had changed completely in no more than five years. No other industry, he maintained, brought co-operation between member firms to so fine a pitch and Britain had produced instruments many of which had not been duplicated anywhere else in the world.

At the general session on 17 October, the vice-president, Mr. A. W. Smith, said the industry was in a boom condition. Referring to the success of the SIMA exhibit at the international exhibition of scientific instruments in Philadelphia, Mr. Smith said he was sure that Britain could gain a useful part of the American market.

Sulphur Prices on Downward Trend

Ample US Supplies & Growing Mexican Output

RECENTLY issued, the sixth quarterly bulletin of the Sulphur Exploration Syndicate (35 Portland Place, London W.1) maintains the high standard of the previous numbers. Included with it is a comprehensive index to the previous issues.

The sulphur industry of the Union of South Africa, the Commonwealth country reviewed in the current bulletin, is at present undergoing considerable expansion. The programme of uranium extraction from gold ore residues, initiated in 1950, created a need for nearly 500,000 tons of sulphuric acid which is being met by seven new sulphuric acid plants. All but one obtain their sulphur requirements in the form of pyrites concentrates, which are produced as a sequel to the uranium extraction process. Whereas pyrites, present in gold ore in widely disseminated state, were not economically recoverable on a large scale, the integration of this process with uranium extraction made this not only possible but attractive.

The non-uranium section of the sulphur industry consumes at present 105,000 tons sulphur, of which 85,000 tons is in the form of imported brimstone. By 1955, the increasing needs of the sulphuric acid industry and the 'regular' sulphur users are expected to total 150,000 tons per annum sulphur, which together with the requirements for uranium production will raise the sulphur consumption in the Union to about 325,000 tons per annum. Of this tonnage over 70 per cent is to be provided from indigenous sources and the balance by brimstone imports, representing an almost exact reversal of the present supply position.

South American Deposits

The sulphur deposits of Peru, although not as extensive as those of Chile, are an important part of world reserves of native sulphur. Primitive mining methods and uneconomic refining facilities result in an output of only a few thousand tons annually. Not generally competitive in world markets, it finds an outlet in South American countries and partly meets domestic requirements which are confined to the use of 'regular' sulphur.

Part of Peru's sulphuric acid requirements

are now met in by-product smelter acid, but the construction of a brimstone contact plant is in hand and a further by-product acid plant is planned. The installation of modern sulphur mining and refining facilities, which are a prerequisite to the fuller usage of the country's sulphur wealth, is at present under consideration by US interests. Although the expansion of domestic sulphur-using industries is planned, foreign investment in Peru's sulphur industry will depend on its ability to compete in export markets.

North American Production

In the US production during the second quarter of 1954 of native and recovered sulphur continued at the high level of the preceding period and amounted to 1,458,192 tons. Thus, output during the first half-year was over 10 per cent higher than during the corresponding period of 1953. As a result of increased apparent domestic and export demand in the second quarter totalling 1,499,503 tons, there was a moderate reduction of stocks although at the end of June these were still about 200,000 tons higher than at the beginning of the year.

Although apparent domestic sulphur consumption in the first half-year was about 14.75 per cent lower than in the first half of 1953, it is believed that consumers' stocks were substantially reduced, and that the drop of actual sulphur use was only about 5 per cent, primarily due to the lower industrial activity in the steel and rayon industries. At the same time, sulphur exports rose to a record level corresponding to an annual rate of 1,500,000 tons.

The successful exploitation by Anaconda Copper Mining Corporation of the Leviathan Sulphur Mine, a low-grade sulphur deposit in Nevada, and the direct use of the crude material in large-scale sulphuric acid manufacture, provide a useful pointer for the economic development of other sulphur ore deposits where similar special conditions, permitting integration of the production cycle, obtain.

The consumption of sulphur in all forms in Australia during the fertiliser year 1953/54 amounted to 271,000 tons, the highest on record, resulting also in peak output of sul-

phuric acid and superphosphates. Adequate supplies of imported brimstone were reflected in slightly lower consumption of indigenous pyrites, although it is probable that pyrites use may rise again if the recommendations of the Tariff Board in respect of the Sulphur Bounty, payable to producers of acid from indigenous sulphur raw materials, enable them to compete with consumers of imported brimstone.

Sulphur production in Canada in 1953 suffered a severe setback as a result of much reduced shipments of by-product pyrites from Quebec caused by prolonged strikes. Increased use of sulphur in smelter gases and recovery of sulphur from natural gas partly off-set this, and resulted in a total output of 352,168 short tons, 18.5 per cent less than in 1952. New projects to yield sulphur from pyrites and natural gas promise to increase Canada's sulphur output by nearly 70,000 tons per annum from the autumn of 1954 onwards.

High UK Consumption

In the UK consumption of sulphur in all forms during the second quarter 1954 amounted to about 210,000 tons, 14 per cent more than during the corresponding period of 1953. Elemental sulphur consumption totalled 91,100 tons, 2.5 per cent less than during the first quarter, but in view of comparatively greater reduction in the use of pyrites and spent oxide for acid making, the proportion of brimstone acid rose fractionally to 35 per cent. Total acid output amounted to 512,200 tons, 13.5 per cent more than during the second quarter of 1953. Acid consumption declined seasonally after mid-May. The total of 504,800 tons was 9.5 per cent greater than that during the corresponding period of 1953, with increases taking place in most sections of the industry. The only major decrease is recorded in the use for superphosphate manufacture.

The slight upsurge of the proportion of brimstone acid production in the second quarter was fortuitous, and not the result of a deliberate act of policy concerning the balancing factor. The possibility of this trend continuing cannot, however, be ruled out with plentiful low cost brimstone supplies coming forward and present actual production costs of brimstone acid 20-28 per cent lower than those of pyrites acid.

The refining process developed by Societe de Languedocienne de Recherches et

d'Exploitations Minières is described in this issue of the Bulletin. Although specially designed to treat the impure, low-grade ores of Malvezzy, it is suitable for all types of sedimentary and volcanic sulphur ores. It entails flotation of ore to yield a concentrate of at least 70 per cent sulphur, which is then refined by a process of gangue agglomeration. There is also a description of the wet contact process developed by Lurgi Gesellschaft für Chemie und Hüttenwesen mbH, for the recovery of sulphur in the form of sulphuric acid from coke-oven gases.

During the recent months world market prices of sulphur have shown a slight downward tendency, and ample American Frasch supplies have comfortably met domestic and export demand. The successful start of production at the Jaltipan dome and continued satisfactory output at San Cristobal dome virtually assure that in 1955 about 500,000 tons of Mexican sulphur will seek export markets. Offers to date are competitive.

Offers of Chilean sulphur at near competitive prices are failing to find buyers, but a severe price cut has permitted sales from the Italian sulphur stockpile to start. With ample low-cost sulphur supplies in sight the world sulphur markets promise to enter a period of competition.

Pyrex Versus Polio

PRODUCTION is now going on at the Sunderland works of James A. Jobling & Co. Ltd. of the first 'screw-top' heat-resisting glass test tubes ever made in this country. These Pyrex containers are being manufactured to fulfil a top-priority order from medical research workers whose object is to produce, with their aid, a successful vaccine with which to fight poliomyelitis.

Experiments carried out, both in this country and America, have shown that the polio virus will not be developed in containers made of ordinary glass, and for this reason (and also because of its great resistance to heat and the chemical processes used in sterilisation) Pyrex glass has been chosen as the most suitable material. Why it is that virus can be cultured in Pyrex but not in other glasses remains unknown, but the fact appears to be firmly established.

The test tubes are 150 mm. in length, with a diameter of 16 mm., and each has a 'screw-top' on to which a metal or plastic cap may be fitted.

High Rate CO₂ Absorption

Paper Read to North-Western Chemical Engineers

THE first meeting of the new session of the North-Western Branch of the Institution of Chemical Engineers was held at Manchester on 9 October when a paper, 'The Absorption of Carbon Dioxide by Alkaline Solutions,' was presented by Dr. G. E. Edwards, Mr. R. Robertson, Dr. F. Rumford and Mr. I. Thomson. Dr. Rumford read the paper in the unavoidable absence of his co-authors.

The aim of the work was to obtain a high rate of absorption of carbon dioxide. Experiments on the mass transfer of gas across a gas-liquid interface usually are made in wetted-wall towers. A low absorption rate is obtained because carbon dioxide is sparingly soluble in all aqueous solutions, because there is a slow diffusion of the dissolved gas away from the interface in the liquid phase and because the absorption operates under a very small difference in concentration of gas across the gas film. When dissolved alkali is present in the liquid, the low solubility of carbon dioxide probably causes the reaction to be confined to a shallow surface layer, and therefore absorption rates will be controlled by rates of diffusion and of reaction.

Increasing the Rate

Ammonia solutions were used in many of the experiments, and the principal controlling factor was the slow rate of formation of the initial reaction product. Practical measures calculated to increase the absorption rate were mixing ammonia gas and carbon dioxide to form the initial product or complex in the gaseous phase instead of in the liquid phase, and exposure of the gaseous mixture to a newly-formed jet of liquid, which by virtue of its newly-formed surface was abnormally reactive.

Ammonia and carbon dioxide were metered to a long, vertical, cylindrical reaction chamber through diametrically opposed openings in the vessel, which was fitted with a movable spray. The mixed gas and liquid spray passed down the vessel and the liquid was separated from the gas at the bottom of the vessel. The whole length of the vessel was used as a reaction space for the gases and the position of the spray could be

changed at will. The rates of flow of equivalent weights of the gases and of the water to the spray were constant.

The liquor was analysed for carbonate and for ammonia by standard methods. The absorption rates were lower than expected, probably because the formation of a soluble compound in the gaseous phase had not been sufficiently rapid to obtain high rates of absorption which were controlled by the liquid film. Freshly formed spray was more effective than spray which had not recently been formed.

Washers which used freshly-formed sprays were used for further experiments with ammonia solutions as the absorbent. The washers used a double rotor with all the rings rotating and the gas flowed concurrently with the liquid. Experiments on a washer with a vertical shaft showed increased absorption with increased liquor rates but neither an increase in the gas rate nor the rotor speed had any effect on the absorption rate. Experiments with horizontal-spindle rotors were made at a constant rate of flow of gas, but changes in ring design and in rotor speeds produced no change in absorption rates.

Absorption rates increased steadily with the normality of the ammonia solution used as absorbent. The rate of absorption increased linearly with the liquor rate and, when calculated on the active space in the absorber, was very high. It was concluded that the experiments with rotary units substantiated the measurements of absorption by jets of liquor.

Wife's Will

MRS. LAURA MARGARET SUGDEN, of Royds Hall, Low Moor, Bradford, wife of Mr. Henry Ellison Sugden, chemical manufacturer, left £27,733 (net £26,984, duty paid £2,912). She left effects to her husband and the remainder of her property upon trust for him for life and then one half upon trust for her son, Allen C. Sugden, chemical engineer, of Leeds, on attaining the age of 30 years, and one half upon trust to her son, Henry T. Sugden, chemical salesman, of Sheffield, on attaining the age of 40 years.

New Process of Titanium Manufacture

I.C.I. to Start Large-Scale Production Next Year

FIFTY of the senior technical staff of the British aircraft industry on Tuesday attended a conference arranged by I.C.I. at one of their Birmingham factories to discuss the properties of titanium and its alloys, the problems of handling and joining the material and questions of its availability.

In the course of the conference it was confirmed that the process I.C.I. has developed uses sodium in the reduction of titanium tetrachloride. Their main plant, which is in an advanced stage of construction and will be in operation within the next six months, will thus be the first large-scale production unit to operate a process other than that devised by Dr. Kroll, which came into prominence, particularly in the USA, after the war. As announced in *THE CHEMICAL AGE* last week, the first American plant using the sodium process is not expected to be in production commercially within the next 18 months.

The General Chemicals Division of I.C.I., who are responsible for making the raw titanium sponge, started research on this metal some years ago. After a considerable amount of exploratory work had been done I.C.I. decided that the reduction of titanium tetrachloride by sodium was the most promising process, especially for British conditions, and that it was likely to give good quality material at a price competitive with that of any other known process.

Not a New Process

This process in its essentials is not new. In fact, it was the method by which titanium was first isolated. It had been stated, however, that this reaction would be uncontrollable on a large scale, and the raw titanium sponge made by the sodium reduction of titanium tetrachloride would not have the necessary properties to allow good quality massive ingots to be made. The work in the I.C.I. Research Laboratories indicated that this was not necessarily true, and that, potentially, the reduction of titanium tetrachloride by sodium was economically attractive.

A semi-technical plant was erected in 1953, and a larger pilot plant was erected and started operation early in 1954. The

results obtained on these plants have confirmed the early work, both in the quality of the product obtained and in the efficiency of the process, and have also solved many problems connected with the design of such a large plant. Such was the faith of the company in the sodium process that it took the decision to build, and started design on, the large-scale plant late in 1953, well before the pilot plant started operation. This large-scale plant is being built in the North of England, and, construction having gone according to schedule, it is expected that the first units will come into production in the first half of 1955, and that full production will be reached before August.

Meets Exacting Demands

Meanwhile the pilot plant has worked steadily, and many tons of material have been produced and sold. The product from the plant is in the form of granules, which can be compressed into pellets for melting. After the melting into ingots, the material has a hardness which compares favourably with the product by the Kroll process, and meets the exacting demands of the users.

Extensive research and development work has also been done by I.C.I.'s Metals Division on processes for melting and fabricating titanium and its alloys. A pilot plant at one of their Birmingham factories has been melting raw titanium sponge for some time past at the rate of 150 tons a year, and converting it into ingot, forging stock, and various fabricated products which have been supplied to the aircraft industry. A major plant for melting and preliminary fabrication of titanium and its alloys will be completed early next year, when supplies of strip, sheet, rod, tube and wire, in addition to raw titanium sponge, ingot, and forging stock, will be available on a large scale.

The capacity of the full-scale plants which are being erected is 1,500 tons a year. Though this capacity may seem small compared with the announced intentions of the American makers, it is not much less than the amount of titanium sponge actually produced in America in 1953 (2,250 short tons), and the plant has been designed so that it can be expanded when required.

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Indian Newsletter

FROM OUR OWN CORRESPONDENT

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THE overall industrial production in India reached a post-war peak level in 1953-54 according to the progress report for the first three years of the Five-Year Plan of the Government of India. The Sindri Fertilisers factory produced 249,000 tons of ammonium sulphate in 1953-54 as against a production of 230,000 tons in 1952-53. The target for 1955-56 has been fixed at 315,000 tons. A number of private industries increased their outputs during the period under review. It has been reported that the percentages of increase of production in 1953-54 over those of the preceding year are soda ash 39.3; caustic soda 47.0; power alcohol 12.9 and salt 6.1. The report further states that an up-to-date plant for the manufacture of 10 tons of calcium carbide per day will go into production shortly and expansion schemes for increasing the installed capacity for soda ash by 30,000 tons per annum will be completed during the current year.

* * *

The Government of India, as a sequel to an offer by the Government of the Soviet Union, have now invited a team of specialists from Russia to visit India early to study the technical and other aspects about setting up a new steel plant in this country. With an upward assessment of the country's steel requirements, a new sense of urgency has been imparted to official thinking on the problem of expanding steel production in India. The Soviet Union's offer of help was accepted after serious consideration by the Government of India. The interesting features of the Russian offer are that the Soviet technicians hope to establish a new steel plant to produce 500,000 tons of steel in about 18 months, which would mean that the new plant will start production earlier than the Rouerkala one and that the Soviet Government are prepared to advance a loan, if necessary, at a rate of interest of roughly half of that of the World Bank.

* * *

A new battery of coke ovens, together with by-product recovery plants, has been set up at the Sindri Fertilisers factory and commissioned into production. The battery of coke ovens, built at a cost of Rs. 2,500,000

(£187,500) has been entirely financed from Sindri's own resources. It may be pertinent to point out here that Sindri Fertilisers Ltd. has recorded a net profit of Rs. 470,000 (£35,250) during 1953-54, which is about 40 per cent higher than that of the previous financial year and which is ascribed to higher production. A scheme of expansion of the factory is under consideration.

The new coke ovens will produce about 200,000 tons of coke per annum. At present about 150,000 tons of hard coke and 10,000 tons of soft coke are produced annually, with a partial recovery of by-products. The present production of benzole is estimated at 120,000 gal. monthly and with the new recovery unit very considerable quantities of benzole are anticipated. It has been recommended that other units be set up elsewhere in India to produce coke with complete recovery of by-products as benzo'e and ammonia. The setting up of a synthetic petrol plant is also currently engaging the attention of the Government of India.

* * *

A modern factory to produce about 6,000 tons of soap per annum with provision for the complete recovery of glycerine will be erected in Bangalore in the near future. This was revealed at the annual conference of the All India Soap and Toiletries Makers' Association held recently. While there are 48 major soap factories in India, producing about 86,376 tons of soap, as against an installed capacity of 193,500 tons per annum, there are only seven units producing about 5,200 tons of crude glycerine and six units producing 2,300 tons of refined glycerine. After meeting internal demands, glycerine is exported both in the crude and in the refined form. It was pointed out that the recovery of glycerine, especially by the small manufacturers of soap, would make the industry more economic, the establishment of a separate chemical laboratory to deal with solvent extraction, refining and hydrogenation of vegetable oils, chemical processes and by-products was called for and a development council for the industry was also considered necessary.

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The Indian Standards Institution have

released a draft amendment to the tentative specification for superphosphate issued in 1951. The amendment deals with moisture and free phosphoric acid. Draft standards covering specifications for cyclohexane used in the paint industry, penta-chlorophenol for wood preservation, carbon disulphide (Technical) for rayon paper and rubber industries, benzole and toluole industrial grade solvents, toluole pure nitration grade, carbolic and cresylic acids for fine chemicals, naphthalene for manufacture of dyes, ammonium sulphate for fertiliser and Leclanché type dry cells for telecommunication have been circulated for comments. According to the recommendations of the International Technical Committee on laboratory glassware, a temperature of 27°C has been prescribed for the tropics in the graduation of volumetric glassware and Indian specifications for measuring cylinders and related wares have been prescribed. Standard specifications for oxalic acid and potassium dichromate, both technical and analytical grades, have also been issued.

* * *

A simple process for the recovery of nickel from spent catalysts of the vegetable oil industry has been reported to be evolved at the National Chemical Laboratory, Poona. It is stated that appreciable quantities of spent nickel catalysts are available annually from the industry producing about 190,000 tons of hydrogenated oils. Nickel sulphate is recovered which could be used in the electroplating industry.

Mexican Sulphur

GUEST Industrials Ltd. announce that they have been appointed sole distributors in the United Kingdom and Northern Ireland for Mexican sulphur produced by the Pan American Sulphur Co.

Deposits of approximately 30,000,000 tons have already been proved on the concession held by Pan American at Jaltipan, Mexico. The plant which went into production on 28 September has an annual capacity of between 400,000 and 600,000 tons of high quality bright sulphur of 99.94 per cent purity, free of arsenic, selenium and tellurium, and it is capable of further expansion. Dock loading facilities at Coatzacoalcas are designed to deal with 500 tons an hour.

Shipments of any size will be available for England from 1 January 1955. The distributors are ready to handle inquiries.

Lac Specifications

International Meeting in London

EIGHT countries participated in the International Organisation for Standardisation's meeting on lac, held in London at the beginning of last week. A further 18 countries have asked to be kept informed of the progress of the work. Chairman of the meeting was Mr. H. M. Patel, the Secretary to the Ministry of Food and Agriculture of the Government of India.

'Three draft proposals dealing with international specifications for seedlac, shellac, and bleached lac respectively have been under considerations of this committee now for over five years,' he said. 'At present these specifications are in the third draft stage. It would be scarcely correct to describe this as very rapid progress, but it is at any rate most encouraging that it has been possible to reach agreement in respect of the bulk of the provisions of these drafts.'

'There is not a single point of disagreement so far as the actual specifications for seedlac and shellac are concerned. Even in respect of the methods of test for these materials, the points on which divergent views have been expressed are very few, and only in one particular case can the divergence be said to be sharp—that is on the question of iodine value of shellac which has to be agreed to enable the quantitative determination of rosin. I trust that we shall be able, on this occasion, to reconcile these remaining points of difference.'

Ten Year Dinner

SIXTY members of the staff of Foxboro-Yoxall Ltd., of Merton, London S.W.19, have now qualified for membership of the English group of the firm's Ten Year Club, including those who completed ten years' service this year. At the sixth annual emblem presentation dinner, held recently at the Wimbledon Hill Hotel, Wimbledon, new members were welcomed at the reception and afterwards presented with emblems by Mr. B. H. Bristol, president of the Foxboro Company, USA.

In a speech at the dinner, Mr. Bristol spoke of the close integration of the American, Canadian and English units of the organisation.

A Controllable Heating Device for Microchemical Operations

By J. T. Stock, M.Sc., Ph.D., F.R.I.C., and M. A. Fill, F.R.I.C.
(Norwood Technical College)

PARTICULARLY when gentle heating is required, direct application of a flame to microchemical apparatus is liable to give poor temperature control. If the flame is brought too close, local overheating occurs, whereas if the flame is placed several inches below the apparatus to be heated, the slightest draught deflects the rising stream of hot air. These difficulties can, of course, be overcome by use of a liquid bath, but where precise control is needed, or prolonged runs are involved, the temperature of the bath needs to be watched. Further, the exterior of the vessel must be dried after heating; water and perhaps glycerol are unobjectionable in this respect, but the case is otherwise with oil!

Besides providing the non-localised heating characteristic of a liquid bath, the damper-controlled heating device shown in Fig. 1 permits the rate of heating to be altered very rapidly, or to hold quite steady for prolonged periods. Heat is supplied by burner A, which is merely an ordinary Bunsen burner from which both base and flame tube have been removed. A new base B about 45 mm. in diameter is fitted; for a maximum heating temperature of about 100° C the base may be constructed from

two bakelite reagent-bottle caps, as shown in section at (a).

For higher temperature a heat-resistant base, such as a slip lid from a tin-plate can or a thick disc of asbestos composition sheet, should be used. Slightly larger in diameter than the burner base, chimney C is of tin plate or other thin sheet metal. For low-temperature work, the seam may be soft-soldered, but hard soldering is, of course, preferable. Since the seam need not be airtight, jointing by means of three or four small rivets or nuts and bolts, or merely by folding over the edges as in tin can manufacture, is equally acceptable.

Eight equally-spaced 3 mm. diameter holes D, just above the top of the base, admit air to the flame, while further holes E provide a permanent outlet for hot gases. Consisting of two sheet metal discs riveted or bolted together on to a 4 BA brass rod spindle, butterfly valve F is mounted just above the upper set of holes. Details of construction are shown at (b), and although the butterfly need not be an airtight fit in the chimney, the clearance should be reasonably small. The longer projecting end of the spindle is bent upwards to form handle G, and

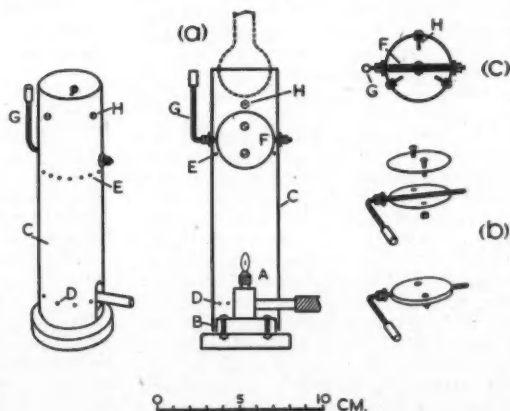


Fig. 1.—Controllable heating device: (a) burner, (b) details of construction of butterfly valve, (c) plan view showing safety projection

which may carry a light insulating knob if desired.

Three equally spaced brass bolts H, projecting inwards as shown in plan view (C) are located about 25 mm. from the top of the chimney. These prevent accidental fall into the chimney of the flask or other vessel being heated. The maximum diameter of the latter must be a little less than that of the chimney; the ideal state of affairs is shown in broken lines. The maximum rate of heating attainable is of course governed by the size of the flame, which, being shielded from draughts, may be no higher than a few millimetres. When the edge of the 'butterfly' disc is in line with the axis of the chimney, flow of hot gases past the vessel is at its maximum. As the way is progressively obstructed by moving the disc, an increasing proportion of gases flow out from the upper set of holes.

This heating device has proved very satisfactory in such applications as micro-fractional distillation¹, ebullioscopic molecular

weight determination², and certain organic preparations. An example of the latter is the preparation of 2-methyl-2-butene ('isomylene'). The following brief details are adapted from those given by Kline³.

Mix 3 ml. of concentrated sulphuric acid with 5 ml. of water contained in a 20 ml. microflask and cool to room temperature. Add 7 ml. of amyl alcohol, drop in a boiling stone, and attach the flask to a simple micro-fractionating column¹. Mount the assembly over the heating device and adjust the control until distillation proceeds slowly, but at a rate not exceeding 0.2 ml. per minute, until the temperature of the vapour reaches 40°C. Since the product is volatile, the receiver should be cooled in ice. Dry the product over anhydrous magnesium sulphate and redistil if necessary.

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Hopes of Further Outlets Sulphate of Copper Association

THE 30th Annual General Meeting of the British Sulphate of Copper Association Ltd. was held at the Association's offices at No. 1 Great Cumberland Place, London W.1, on 19 October, the chairman, Mr. J. D. McKechnie, presiding.

The chairman, in opening the meeting, said: 'During the past year the outstanding matter affecting the Association's business was the difficulty in obtaining adequate supplies of raw materials, as a result of which production was down by 7,000 tons. Also we experienced increased competition from foreign producers in our export markets.'

'There was a decrease of about 8,000 tons in our export trade due to shortage of supplies, about half of which related to dollar exports. However, this decrease was offset to some extent by an increase in our home trade.'

'The total value of our exports amounted to about £3,000,000, of which nearly £1,000,000 was for dollar markets. It was interesting to note that some European markets which have been closed to us for many years were opening up again.'

'With regard to home trade, quite a good proportion of the increased sales was for

use in agriculture and evidently more spraying was carried out. It is to be hoped that spraying will be extended still further next season, for if the bad weather prevails, there may well be more potato blight.'

'During the year an important discovery was made when it was found that in using sulphate of copper to kill bilharzia snails, the aquatic weeds were also destroyed (THE CHEMICAL AGE, 1954, 71, 267). It is thought that this weed control question may lead to further outlets for sulphate of copper.'

'Current research work on copper deficiency in soils and animals is being followed with interest, and we are intensifying our advertising campaign in connection with liver fluke of sheep and young cattle which is widespread and is likely to become worse in rainy seasons.'

'With regard to the present season, the prospects are fairly promising providing raw materials are available and competition can be met. We have already obtained a substantial dollar order.'

'Finally, I should like to thank the members of the management committee for their help and cooperation during the year. Also I feel sure they will all wish to join me in thanking the general manager and his staff for their hard work during the past season and for their continued loyal service.'



The Chemist's Bookshelf

CATALYSIS. Vol. 1. Fundamental Principles (Part I). Edited by Paul H. Emmet. Reinhold Publishing Corporation, New York; Chapman & Hall, London. 1954. Pp. iv + 394. 80s.

This volume represents the first fruits of a joint effort by a team of specialists and there seems little doubt that it will become an important landmark in the extensive and rapidly growing literature on catalysis. The authors, under the editorship of Paul Emmet, a notable pioneer in the field, have set out to provide, in a series of volumes, complete coverage of catalytic phenomena, including not only the fundamental scientific aspects but also what might be called the treatment of catalysis as an art, which there is no doubt it still to some extent remains. That it is less an art than a science, however, will be obvious from a survey of the contents of Volume 1. The industrial importance of the subject has ensured that no scientific effort should be spared on the grounds of expense with the result that there has been a veritable flood of literature embodying experimental results of widely differing kinds. New ideas have unfortunately been less prominent. Perhaps the most encouraging is the attempt to relate catalytic activity directly to the electronic structure of the solid catalyst, but here much remains to be elucidated and the chemist or engineer choosing a catalyst for a particular operation must still rely to a large extent on empirical correlations. There is no doubt that one of the important objects which the authors of this series have had in mind is to make these empirical correlations available in the most accessible form.

The first two volumes of the series are planned to deal with the fundamental principles of catalysis, the volume under review dealing with the following topics: physical adsorption, measurement of the surface area of solid catalysts, chemisorption, kinetic laws and absolute rates of surface reactions, catalyst preparation and the relationship between magnetism and catalysis. The

treatment is exhaustive throughout and there is a very large number of references to the original literature. In one table the reader can find at a glance what work has been done on any particular metal surface, the types of investigation carried out, the temperature and pressure ranges covered, the heats of adsorption and the activation energies if measured, and detailed references to the original papers concerned. Tables of data of this kind abound and constitute a notable feature of the book.

It is possible to forecast certain success for this series of volumes. Every reference library will wish to have it and there can be few practising chemists, who, if they could afford it, would not have it on their bookshelves. Further volumes will be awaited with the greatest interest.—R. C. PINK.

INDUSTRIAL AND MANUFACTURING CHEMISTRY. PART II: INORGANIC. By G. Martin. 6th Edition, edited and revised by W. Francis. The Technical Press Ltd., London. 1954. Vol. I, pp. xxiii + 600. Vol. II, pp. xxi + 491. 70s. per volume.

About 20 years have elapsed since the appearance of the previous edition of this work, and it is claimed that it has been completely revised. The two volumes comprise 90 sections dealing with various branches of industry, and it would therefore be impracticable to list these completely. It will be sufficient to say that most important inorganic industries appear to be included, down to a brief section on that most recent of all major industries, the production of atomic power. A number of the sections have been revised by specialists in the particular industries concerned.

It is stated in the preface that 'all out-of-date matter without historical or technical significance has been replaced by new matter, but the older material relating to the classical development of processes or industries has been retained because of its great value to students, manufacturers and com-

mercial interests.' However, no clear distinction is made in the text, as a rule, between the older and the newer material. Examples may be taken at random. In the section on the electric lamp industry much more space is devoted to the historical development of the lamp than to fluorescent lighting, although nowadays the latter topic is of considerable importance. In the section dealing with the synthetic gem industry the reader is left with the distinct impression that no such thing as a synthetic sapphire industry exists in this country. The modern extensions of fluorine and silicon chemistry do not appear to be indicated anywhere.

The illustrations too often give the impression of representing 'period pieces' rather than actual modern pieces of industrial equipment. The type used does not, on the whole, make for clarity.

It is probable that a comprehensive work of this type, to be authoritative and to inspire confidence in its authoritativeness, should be entirely produced by experts in the various fields. The modern ramifications of industry are so widespread that it is doubtful if any outsider can obtain sufficient grasp of a number of industries to present a reliable account of them suitable for the general chemical public and sufficiently up-to-date to be useful. This work undoubtedly contains an enormous mass of information. Whether it is the information for which most of its readers will be looking is, however, a matter on which the reviewer would hesitate to express an opinion.—CECIL L. WILSON.

THE THEORY OF EMULSIONS & THEIR TECHNICAL TREATMENT (Clayton). Fifth edition by C. G. Sumner. J. & A. Churchill Ltd., London. 1954. Pp. viii + 669. 72s.

It is probably easier to write a completely new book than it is to produce a new edition of one written originally by somebody else, the more so when the book in question has dominated its own field of technical literature for more than 30 years. Dr. Sumner, the author of this revision of Clayton's 'Emulsions,' is to be congratulated on the completion of a difficult operation.

Although those familiar with earlier editions will notice little change in the form or layout of the book, the text has been extensively revised throughout and much new matter added where advances in emul-

sion technology warrant it. There is a new chapter, for instance, on emulsion polymerisation and much valuable new material in the sections on synthetic emulsifying agents and on emulsifying machines. Emulsion polymerisation, in which a polymerisable organic liquid is dispersed in an aqueous phase containing an emulsifying agent and a catalyst, has become of considerable industrial importance in the manufacture of synthetic plastics. The main advantages of the heterogeneous polymerisation process are that higher rates of conversion are obtained and the process is much more readily controlled. Also, the product may be obtained in the form of an easily handled granular powder, which is particularly advantageous in the case of thermoplastics.

The emphasis throughout, as in the original book, is on the practical side of emulsion preparation and it is in the chapters devoted to the technological aspects of emulsions that the author is most successful. A valuable feature is the inclusion of a large number of references to the patent literature, not only of this country, but of the United States and Germany. An assured welcome awaits this new edition from all those concerned with the preparation and study of emulsion systems.—R. C. PINK.

HISTORY OF INDIAN PHARMACY. Volume I. By G. P. Srivastava. Pindars Ltd., Calcutta. 2nd Edition. 1954. Pp. xiii + 276. Rs. 12.8.

The first part of what is designed as a two-volume work describes the evolution of pharmacy from its origins in mythological mists to medieval days. The author is greatly concerned at putting the ancient pharmacy on the map, 'where it has so long been either missing or occupying only an insignificant position.' He also seeks to establish that it was the Indians who influenced Greek pharmaceutical development and not the reverse.

The chief interest lies in descriptions of early Indian medical treatises, some written several thousand years before the beginning of the Christian era, which show an extensive knowledge of drugs and are not merely a collection of charms and spells. The English in which the book is written at times shows some confusion (e.g. 'seconded to none') and there are a number of typographical errors. Readers are referred to the corrigenda at the end.—A.N.W.

HOME

September Steel Production

Steel production in September averaged 372,300 tons a week. This is considerably higher than the figures for August and exceeds the previous best September in 1953—when the weekly output was 346,500 tons. Pig iron production averaged 222,900 tons a week, compared with 227,400 in August. The decline is due to certain furnaces being out of production for relining.

Midlands Electronics Exhibition

The Scientific Manufacturers' Association announce an exhibition of electronic aids to production, design, and research, under the title 'Electronics at Work,' to be held in Birmingham from 23-25 November at the Chamber of Commerce Hall. The exhibition theme, Electronics in Action, will be exemplified by a large number of working demonstrations showing the employment of electronics in a wide range of industrial applications, in public services, medicine, and education, and in varied spheres of research and development.

New Plant at Cement Works

Extensions at the Magheramorne (County Antrim) works of British Portland Cement Manufacturers Ltd. have increased the output rate from 182,000 tons in 1953 to 300,000 tons a year. Magheramorne is now producing more than enough cement to meet Northern Ireland's full requirements, in addition to the supplies shipped to Scotland and the Isle of Man. The Ministers of Finance, Commerce and Labour were present at a ceremony to mark the installation of the new plant.

'A Penny for a Song'

Following our note on 9 October of the forthcoming production by the Stock Exchange Dramatic and Operatic Society of 'A Penny for a Song,' our readers may like to know that the Queen is to attend the performance at the Scala Theatre, London, on Thursday 2 December. All tickets for that performance are sold, but a few tickets are available for the performance on the previous evening, Wednesday 1 December, which is in aid of the John Benn Boys Hostels Association. These tickets may be obtained from R. D. Howell, Benn Brothers Ltd., 154 Fleet Street, London E.C.4.

Organo-Tin Compounds

Supplies of dibutyl tin dilaurate and dibutyl tin maleate are now available from Albright & Wilson Ltd., 49 Park Lane, London W.1. These compounds are used as stabilisers for polyvinyl chloride in certain special applications such as rigid or unplasticised PVC and clear sheeting.

I.C.I. Chairman Speaks on Management

An address on the changing scene in industrial management was given by Dr. Alexander Fleck, chairman of Imperial Chemical Industries Ltd., to the Industrial Co-Partnership Association on 15 October. He urged incentives for initiative on the part of the manager and said that at present there was a tendency towards conformity and an excessive adherence to precedent.

Monopolies Group Appointed

The chairman of the Monopolies and Restrictive Practices Commission has appointed the following people as members of a group to consider and report on the Commission's references to the supply of oxygen, dissolved acetylene and propane: Mr. D. A. S. Cairns, Q.C. (chairman), Sir Thomas Barnes, G.C.B., C.B.E., Mr. J. A. Birch, Mr. W. L. Heywood, O.B.E., Mr. I. C. Hill, Professor Sir Arnold Plant, Mr. C. E. Wrangham, C.B.E., and Sir Richard Yeasley, C.B.E. Investigations into the supply of the gases have been going on for some time, and the members of the group have already been concerned in them.

Licence of Right Applications

Under section 35 of the Patents Act 1949, the following patents in the name of Albright & Wilson Ltd. were endorsed 'licences of right' on 29 September: BP.625,065, 'Depositing of protective coatings or films on metal surfaces'; B.P.656,303, 'Production of dialkoxothiophosphoryl chlorides'; and BP.684,645, 'Stabilisation of aqueous suspensions of satin white'. Any person who claims that the patentee at the time of endorsement was precluded by a contract in which the claimant is interested from granting licences under the patents may apply for cancellation of the endorsement within two months.

OVERSEAS

Another Titanium Plant

Quebec Iron and Titanium Company, Canada, are considering the building of a semi-commercial titanium plant to produce, at first, three tons of the metal daily.

New Hardboard

The Arbitibi Power and Paper Company of Canada has produced a new hardboard with a grain resembling natural wood on the exterior finish. The board, the result of months of research, is now being marketed.

Sulphuric Acid Factory for Austria

A new factory for sulphuric acid will be erected in Krems on the Danube (Province of Lower Austria). This plant is supposed to produce primarily phosphate fertiliser, which so far has had to be imported. After demands of Austrian agriculture are satisfied, exports of the Austrian phosphate fertilisers are envisaged.

Stockpile Copper Released

The US General Services Administration has been authorised to sell 17,500 tons of copper to consumers who are short of the metal because of recent strikes. A further 9,000 tons of copper scheduled for the stockpile during October have also been made available to consumers.

New US Petrochemical Plant

Two American firms—Electric Bond and Share Company and United Gas Corporation—are planning to build a petrochemical plant at a cost of \$22,900,000 near Pensacola, Florida. Initial capacity of the plant, to be run by a new enterprise, Gulf Chemical Company, is expected to be 200 tons of anhydrous ammonia and 40 tons of polyvinyl chloride each day.

New Wing at Wisconsin University

Constructional work on the new \$1,300,000 wing of the University of Wisconsin biochemistry building began on 30 September. The new wing will be used exclusively for research. One floor will be devoted to work in plant chemistry; a second floor will be used for fermentation studies, and one will be used for research in biophysics. Two basement floors are included in the plans and will be used for equipment and a pilot plant to be connected directly with a large-scale fractionation apparatus.

Belgium Orders from Israel

An order for products to the value of \$100,000 was recently received by the Fertilisers and Chemicals Company in Israel from Belgium. This was the first order received by the company outside the framework of a trade agreement.

US Potash Project

Negotiations are taking place between two American firms—Freeport Sulphur Company and Pittsburgh Consolidation Company—for a joint potash project. The two companies would have a mine and refinery about 30 miles east of Carlsbad, New Mexico.

Aniline Dye Plant for Argentina

Full production is expected within 18 months from an aniline dye plant to be established near Buenos Aires, Argentina, and financed jointly by a local concern, Compania Quimica SA and Farbenfabriken Bayer AG of Leverkusen, West Germany. The name of the new firm will be Fabrica Argentina de Anilinas SA, and the annual capacity of the plant will be 520,000 kg. (over 1,000,000 lb.)

US & German Firm Get Together

A chemical plant is to be built at New Martinsville, West Virginia, by Monsanto Chemical Works and Bayer Chemical Works of Cologne. This is the first joint German-American industrial venture since the war. The plant, which is to produce primary materials for plastics, is expected to be in operation by the end of next year and will be run by a joint subsidiary, Mobay Chemical Company.

Germany Leads at Dutch Exhibition

The Vochema 1954 exhibition of machinery and apparatus for the food-processing, chemical and pharmaceutical industries, opened at Utrecht, Holland, on 20 October and will continue until 27 October. Exhibitors number 90, representing more than 7400 firms. The exhibits originate from England, Western Germany, Sweden, Denmark, Norway, Switzerland, United States, France, Belgium, Luxembourg, Italy, Liechtenstein, Eastern Germany and the Netherlands. Western Germany predominates with 146 exhibits, followed by England with 75 exhibits.

PERSONAL

MR. H. EVANS, superintendent of the development and research laboratories of the Mond Nickel Co. Ltd. in Birmingham has been installed president of Birmingham Metallurgical Society.

SIR ALEXANDER R. TODD, Professor of Organic Chemistry at the University of Cambridge, is carrying out an appointment as Arthur D. Little Visiting Professor of Chemistry at the Massachusetts Institute of Technology, USA, for the current semester. He is giving a series of 20 lectures on 'Selected Topics in Natural Product Chemistry' which began on 4 October. Sir Alexander is chairman of the British Government's Advisory Council on Scientific Policy, and in 1949 was awarded the Davy Medal of the Royal Society of London for the year's most important European or Anglo-American discovery in chemistry. He was knighted in July.

EX-bomber pilot MICHAEL BARRY CARROLL at the age of 30 has been appointed advertising manager of the Crookes Laboratories Limited, Park Royal. His appointment will become operative on 1 November. At present product group executive of Smith & Nephew Ltd., Mr. Carroll has had considerable experience in the toiletry and pharmaceutical industry. Before joining the staff of Smith & Nephew Ltd. he was assistant advertising manager with Macleans Ltd.

MR. J. N. GRIFFITHS, who has previously handled the electrical plant and apparatus business from BTH Sheffield office, is now located in the BTH Nottingham premises, 71-73 Lower Parliament Street. Tel.: Nottingham 43588.

MR. FRANK RAYNS has been appointed to the Agricultural Research Council to fill the vacancy caused by the retirement of PROFESSOR K. MATHER, F.R.S. PROFESSOR S. ZUCKERMAN, F.R.S., has been appointed for a further term.

The Stanton Ironworks Company Limited has appointed MR. G. R. BUCKLEY general works manager. Other appointments are: MR. E. MORGAN, general manager in charge of research; MR. L. RAWLINS, commercial manager; and MR. J. D. HICKMAN, export manager.

MR. T. M. BLAND, of Ipswich, has been elected to the board of Fisons Ltd.

S. M. MACCUTCHEON, safety director, The Dow Chemical Company of Midland, Michigan, has been elected chairman of the General Safety Committee of the Manufacturing Chemists' Association Inc. Mr. MacCutcheon, former vice-chairman, succeeds R. H. Albisser of Merck & Company Inc. G. L. Gorbell, safety director, Monsanto Chemical Company, St. Louis, Missouri, was elected vice-chairman of the committee.

Imperial Chemical Industries Ltd. has created a new group of the company—to be known as Group F (Fibres)—in view of 'the importance of I.C.I.'s extensive and increasing interests in man-made fibres.' The new group, which will be effective from 1 February next, will be in the charge of one director, MR. P. C. ALLEN who will relinquish his appointment as paints and plastics director. Mr. Allen, who will be known as the fibres director, will be responsible to the I.C.I. board for the Terylene Council for furthering the interests of the company and its subsidiaries in research on the development, manufacture and sale of Terylene, Ardil, etc.

Work Study Lecture

A lecture on 'Work Study as a means of increasing the productive efficiency of chemical plants' is to be given by J. Grange Moore, M.A., of the Work Study Department of I.C.I. at the Wellcome Institute, 183 Euston Road, London N.W.1, at 7 p.m. on 10 November. The lecture is organised by the London Section of the British Association of Chemists and visitors are invited.

Visit to George Kent

A party of 15 students and tutorial staff from Brooklands County Technical College, Weybridge, visited the works of George Kent Ltd., Luton, on 13 October. They were shown over the Biscot Road and Lea works and attended a lecture by an application engineer of the firm on the use of instruments in the coking industry.

Publications & Announcements

LATEST issue of *Colonial Plant and Animal Products* is Vol. IV, No. 2, and the contents include articles on the protection of dried hides and skins, and plant ecology, and a series of reports on recent investigations at the Colonial Products Laboratory. This quarterly journal is published by HMSO, price 5s. net, annual subscription 21s.

NEW edition of the 'Featasol' paint media pamphlet has recently been issued, because certain modifications to specifications and nomenclature have been made since the previous edition was printed. The current edition lists all standard media (and their properties) made by Featly Products Ltd., Farrell Street, Lower Broughton, Manchester 7.

THE separation of salt from glycerine liquor in the soap manufacturing industry has always presented a problem because of the labour requirements of the process, and the glycerine losses from the plant. In recent years the Sharples Super-D-Hydrator, which is an automatic self-discharging centrifuge, has been applied to mechanising this operation. Not only is the labour of the operation completely eliminated, but greatly reduced glycerine losses are obtained with lower wash rates. Sharples Centrifuges Ltd., of 'Tower House,' Woodchester, Stroud, Gloucestershire, have recently issued a Report (No. 2254), which gives details of this process and the application of the Sharples Super-D-Hydrator to it. The report, copies of which may be obtained by writing to the firm, includes a typical flowsheet of the salt manufacturing section of the soap plant, as well as details of the operating characteristics of the Super-D-Hydrator on this application.

MORE than 500 terms in use in the textile industry have now been defined and are set out in a publication, *Textile Terms and Definitions* which costs 5s. and can be obtained from the Textile Institute, 10 Blackfriars Street, Manchester 3. Some of the definitions have been officially adopted; others are still tentative. They were framed by members of panels of the Institute meeting in committee and have appeared over a number of years in the Institute's *Journal*.

TEXTILE printing in Switzerland is the subject of the 105th issue of *CIBA Review*, published at Basle. After a short historical survey, a number of articles describe modern trends in printing, dyeing and finishing.

SEPTEMBER additions to the BDH catalogue are 2-bromo-ethylamine hydrobromide, useful for the introduction of amino-ethyl groups and in the production of cyclic imines; butyl vinyl ether, a useful starting-point for unusual syntheses; ethyl vinyl ether, which may be converted to butadiene, or polymerised; β -(2-furyl)-acrylic acid, of considerable interest as a plant growth substance or insect repellent; β -dimethyl-amino-methyl indole, the Mannich base of indole; and tri-isobutylene, technical quality.

'SOME Aspects of Industrial Noise and Vibration Measurement' is the title of a paper published by A. E. Cawkell, electronic engineers of 6-7 Victory Arcade, The Broadway, Southall, Middlesex. The necessity for noise and vibration measurements in industry, and the equipment and methods to make these measurements, are discussed. Also obtainable from the firm are two booklets on 'Unit Pulse Equipment' and 'Special Purpose Pulse Equipment & Oscilloscopes.'

LEAFLET obtainable from J. H. Sankey & Son Ltd., Ilford, Essex, describes the properties and uses of 'Sankey's Super Acid-resisting Cement.' This is chiefly used for the bedding and jointing of vitrified blocks and tiles in the construction of acid-resisting floors, walls and tanks, and for jointing pipes carrying acids and acid fumes. After the cement has set, swabbing with dilute HCl will render it waterproof.

CABLES, metal alloys, plastics and engineering equipment manufactured by The Telegraph Construction & Maintenance Company Limited, 22 Old Broad Street, London E.C.2, are described in words and photographs in their new publication, *Telcon Products*. The booklet contains a brief historical survey of the company's activities, and there is a full list of their other publications dealing with individual products manufactured by the Cables, Metals and Plastics Divisions.

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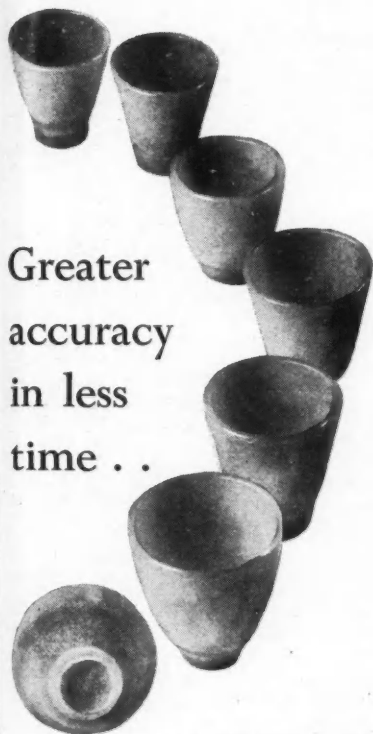
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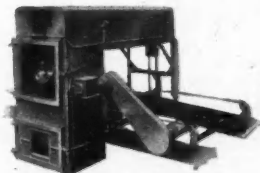
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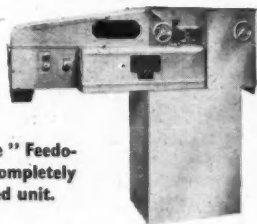
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"Adequate"
Weigher shown
with recorder
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The "Adequate" Feedometer automatically controls the rate of flow of any material travelling along an endless conveyor belt.



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Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

BEREND CHEMICALS LTD. (formerly Sparth Soap Co. Ltd.), London W. 13 September, two charges, to Barclays Bank Ltd. each securing all moneys due or to become due to the bank; respectively changed on plot of land at Clayton-le-Moors and Sparth Soap Works, Clayton-le-Moors. *, 1 July, 1953.

SCRIVENS LTD., Birmingham, manufacturing chemists. 16 September, £4,000 charge, to Alliance Building Society; charged on 27 Kitts Green Road, Yardley. *Nil. 3 July, 1953.

Increases in Capital

The following increases in capital are announced: **STEVENSON & HOWELL LTD.**, from £250,000 to £400,000; **WESTMINSTER LABORATORIES LTD.**, from £100,000 to £150,000; **AKIS CHEMICAL CO. LTD.**, from £10,000 to £20,000.

Changes of Name

The following changes of name have been announced: **HYDROPHANE LTD.** to **MEDICAL FIBRES LTD.** on 7 September. **UNITED PHOSPHATE & MALT CO. LTD.** to **UPM LTD.** on 10 September.

Company News

Borax Consolidated Ltd.

A tentative approach has been made to Borax Consolidated Ltd. by an American group, who desire to obtain control of the company. Before, however, any definite offer can be made by the group two conditions would have to be fulfilled, says a statement from the directors. The permission of the Exchange Control would have to be obtained to transfer the control of the com-

pany out of British into American hands; and the consent of the Treasury would have to be obtained to the transfer of the domicile of the company from the United Kingdom to the USA.

Calico Printers' Association

In their report for 1953-54 the directors of the Calico Printers' Association state that royalties from the Association's Terylene and other patents have shown a small increase compared with the previous year, but Terylene royalties will not have a material effect on the Association's revenue until the plant for bulk production of the fibre is in full production. Group trading profit to 30 June is £2,310,878, compared with £1,788,360.

James Crean & Son (1936) Ltd.

Profit of James Crean & Son (1936) Ltd. to 30 June, after depreciation and tax, etc., was £5,908, against £3,329. An Ordinary dividend of 10 per cent is recommended.

Laporte Industries

Consent of the Capital Issues Committee has been given to the issue of Cumulative preference shares in connection with Laporte Industries' bid for Fullers' Earth Union. The board of Laporte Industries say the company's offer to acquire Fullers' Earth shares has been accepted by so far over half in the nominal account of each class of Fullers' Earth capital.

Solidol to Buy Ashe Laboratories

The directors of Solidol Chemical propose to acquire the capital of Ashe Laboratories and change the parent company's name to Ashe Chemical. As a preliminary, they propose to subdivide the 2s. shares into two of 1s. and increase the authorised capital to £300,000. The profits of Ashe Laboratories are stated to be already higher than in 1953.

Thos. W. Ward Limited

The interim dividend paid on the Ordinary shares on 31 March, 1954, was on the then capital of £1,100,000 and was at the rate of 5 per cent per annum. In terms of the increased capital of £2,200,000 this was equivalent to 2½ per cent less tax. At the 51st annual general meeting of the company, to be held on Friday, 19 November, 1954, the directors will recommend the payment of a final dividend of 10 per cent, less tax, on the increased Ordinary share capital of £2,200,000.

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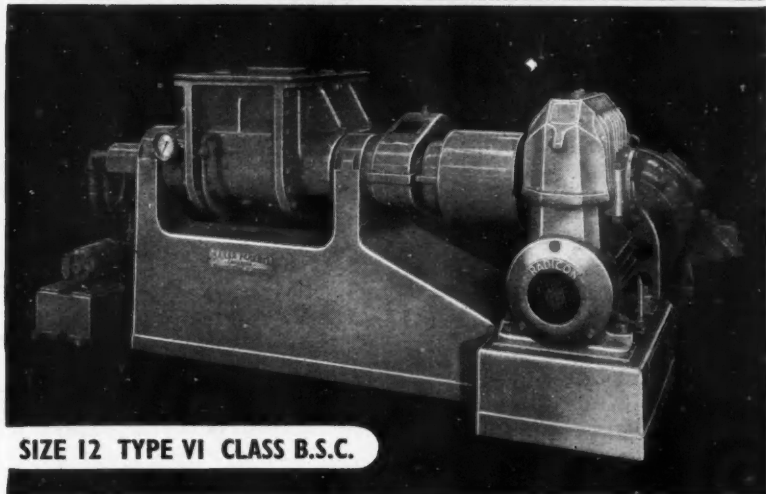
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had 75 years experience of making them.

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Next Week's Events

MONDAY 25 OCTOBER

The Chemical Society

Durham: Appleby Lecture Theatre, Science Laboratories, 5.15 p.m. 'Chemical Microscopy' by Dr. N. H. Hartshorne.

TUESDAY 26 OCTOBER

The Royal Institute of Chemistry

Hatfield: Technical College, Roe Green, 8 p.m. 'Molecular Structure and Properties of High Polymers', by C. W. Bunn.

Leeds: Chemistry Lecture Theatre, The University, 6.30 p.m. Joint meeting with Leeds University Chemical Society, 'Polyester Fibres and Terylene', by Dr. Rowland Hill.

Institute of Metal Finishing

Birmingham: Regent House, Colmore Row, 6.30 p.m. Organic Finishing Group, 'The Blistering of Paint Films on Steel Surfaces', by A. Nicholson and H. A. H. Jenkins.

WEDNESDAY 27 OCTOBER

Society of Chemical Industry

London: Chemical Society's Rooms, Burlington House, Piccadilly, 6.30 p.m. Food Group domestic meeting. 'α-Carotene in the Leaves of the Carrot', by Dr. V. H. Booth and 'Rigor mortis in Relation to the Chilling and Freezing of Beef Carcasses', by Dr. R. A. Lawrie.

Institution of Chemical Engineers

Birmingham: 2 p.m. Graduates and Students Section works visit.

The Society for Analytical Chemistry

Glasgow: The Central Hotel, 7.15 p.m. Scottish Section meeting for reading of original papers.

The Institute of Fuel

Manchester: Engineers' Club, Albert Square, 2.15 p.m. Joint meeting with National Smoke Abatement Society. An account of American fuel research and the work of the new fuel efficiency service, by Dr. W. A. Macfarlane.

Society of Leather Trades' Chemists

Manchester: Reynolds Hall, College of Technology, 2 p.m. 'Waste Products from Heavy and Light Leather Processes', by J. M. Harrison.

Manchester Metallurgical Society

Manchester: Lecture Room, Central Library, 6.30 p.m. 'Metallurgical Problems of Atomic Energy', by Dr. H. M. Finnieston.

THURSDAY 28 OCTOBER

The Chemical Society

Liverpool: Chemistry Lecture Theatre, The University, 5 p.m. Joint meeting with the Royal Institute of Chemistry, the Society of Chemical Industry and the British Association of Chemists. 'Chemisorption and Catalysis', by Dr. F. C. Tompkins.

Bristol: Department of Chemistry, The University, 7 p.m. Joint meeting with the Royal Institute of Chemistry and the Society of Chemical Industry. 'Some Recent Advances in Fluorine Chemistry', by Professor H. J. Emeléus.

The Institute of Fuel

Liverpool: Liverpool Engineering Society's Rooms, 9 The Temple, Dale Street, 7 p.m. Joint meeting with National Smoke Abatement Society, North-Western Division. 'Shell Boilers', by A. D. C. Gunn.

FRIDAY 29 OCTOBER

The Chemical Society

Southampton: Chemistry Department, The University, 5 p.m. 'Fluorocarbon Chemistry', by Dr. R. N. Haszeldine.

Society of Chemical Industry

London: Shell-Mex House, Strand, W.C.2, 6.30 p.m. Fine Chemicals Group. Conversazione.

Obituary

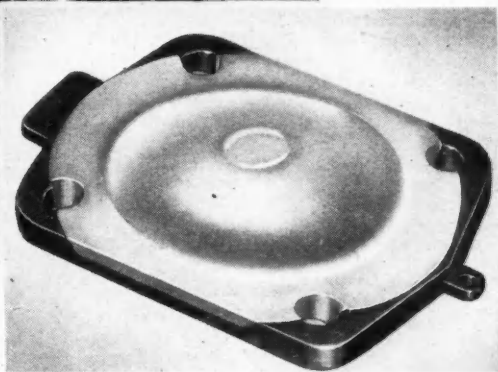
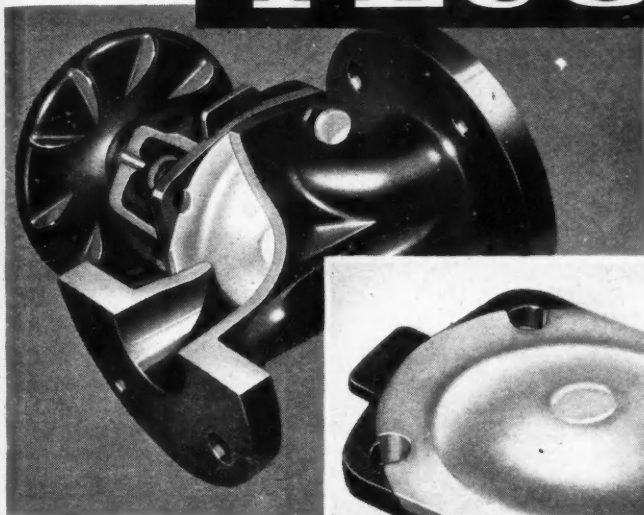
The death occurred on 17 October, at the age of 68, of MR. JAMES HAROLD WADSWORTH. A solicitor, he was appointed assistant secretary of Brunner, Mond Ltd. in 1920, and became the first secretary of I.C.I. when that company was formed in 1926. He held this post until 1929, when he was appointed to the board. He retired in March 1949.

The death occurred last week in a train crash in Holland of MR. JOHN CLIFFORD SUTHERLAND, aged 35, of 5 Rossall Avenue, Liverpool 10, who was deputy chief chemist for British Enka Ltd., rayon yarn producers, of Aintree, Liverpool. A total of six people were killed and eleven injured in the crash which occurred when two trains collided at Elst, near Arnhem, on 13 October. Mr. Sutherland was on a business trip and was due to return to England the next day.

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Imperial Chemical Industries Ltd., London, S.W.1

Antibiotics for Britain

Increased Supplies of Tetracycline Drugs

THE 'golden drug,' aureomycin, will be available for use on prescription by medical practitioners from 1 November. This was announced at a Press conference held last week by the Lederle Laboratories Division of Cyanamid Products Ltd. Sufficient of this valuable antibiotic is now produced in this country to meet all requirements. Effective by mouth, rapidly absorbed, able to diffuse readily into the cerebrospinal fluid, and highly bacteriostatic in the gastro-intestinal tract, aureomycin is effective against a wide range of infections, besides being a useful animal feeding-stuff additive.

Chemically, aureomycin is chlortetracycline, and it was originally believed, during early trials of the drug, that occasional cases of unfavourable side effects might be due to the presence of the chlorine in the molecule. Although subsequent work has indicated that these effects were due to overdosage, tetracycline is also being made available in this country, although it is not yet being manufactured here. This substance, which was developed (as 'Achromycin') by the Lederle Laboratories Division in New York, and also by Charles Pfizer & Co., is made from aureomycin by dehalogenation with hydrogen over palladium. Its antibiotic properties are identical with those of aureomycin.

A Major Achievement

The preparation of tetracycline represents a major chemical achievement, since its structure involves two quinonoid rings and three further double bonds. A published method for dehalogenation of aureomycin (Boothe, J. H., Morton, J., Petisi, J. P., Wilkinson, R. G., and Williams J. H., *J. Amer. Chem. Soc.*, 1953, **75**, 4621) consists of reduction at room temperature and pressure in the presence of 10 per cent Pd on a charcoal support and 1 mole of triethylamine. Slightly more than 1 mole of hydrogen is absorbed, with evolution of heat, by a concentration of 100 mg. of chlortetracycline per ml. in methylcellosolve. The free base is separated by pouring into 5 vols. of water.

Aureomycin and 'Achromycin' are broad-spectrum antibiotics—that is, they are effective against a wide range of organisms including Gram-positive and -negative cocci,

Gram-negative bacilli, protozoa, some viruses and rickettsia. Infections successfully treated have included beta-haemolytic streptococci, *E. coli*, meningococci, staphylococci, pneumococci and gonococci.

Market Reports

LONDON.—Most of the routine industrial chemicals are moving in good volume to the home consuming industries, and overseas demand is keeping up to recent levels. Delivery delays due to the London dock strike are not, as yet, of a serious nature, and merchants appear to be coping with the situation although, in some instances, spot supplies are difficult to negotiate. Firm prices continue to operate for the non-ferrous metal compounds and a steady undertone is reported in nearly all sections of the market. A steady demand for the coal tar products is maintained with rather more pressure for supplies of pitch, phenol and naphthalene.

MANCHESTER.—Contract deliveries of the alkalis and other leading heavy chemicals to the textile and allied trades as well as to other industrial users in the Lancashire area have been reported during the past week, and a fair number of fresh inquiries continue to circulate. Values of the non-ferrous metal compounds are fluctuating in sympathy with the movements of the metals, but otherwise prices during the week have been mostly on a steady basis. In the aggregate a moderate weight of business has been reported in the fertiliser materials. A good demand for the light and heavy tar products continues.

GLASGOW.—The past week has again been a very active one in all branches of the industry. Prices on the whole have been steady, although once again metal salts have varied considerably during the course of the week, but the trend finally was downward. All in all a good week's trading is reported. With regard to export, there has again been considerable activity.

Drug Output Goes Up

British drug production rose in value from about £19,000,000 in 1935 to £115,000,000 last year, Dr. Harry Hepworth, formerly managing director of Imperial Chemical Pharmaceuticals, said last week. He added that exports were now nearly ten times as great as in 1935.

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For efficient mixing it is essential that the materials are evenly distributed throughout the mass. Pascall Mixers produce this result quickly and economically.

They have many features of interest such as removable agitators, self-emptying troughs, safety devices, etc. Six sizes available with trough capacities between 2 cu. ft. and 20 cu. ft.

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Returnable or non-returnable. Swivel clips allow easy access to contents but ensure safe lid closure. Plain, corrugated or beaded body.

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CLASSIFIED ADVERTISEMENTS

INVITATION TO TENDER

INVITATION TO TENDER FOR SHARES

TENDERS are invited by the Administrator of German Enemy Property for the purchase (subject to the Special Conditions of Sale), of the shares described in the fourth column of the Schedule below. Attention is drawn to the fact that, in accepting any tender the Administrator will be guided by the national interests.

The shares offered cannot be split up and a tender must be made for the whole of these shares. Tenders must be in the form provided.

Copies of the Particulars of Sale, the Special Conditions of Sale and the Tender forms may be obtained on application to the Administration of Enemy Property Department (Treasury and Board of Trade), Branch 5, Lacon House, Theobalds Road, London, W.C.1.

The tenders must be addressed to the Administrator of German Enemy Property at the above address and must be delivered there in a sealed envelope not later than 10 a.m. on 7th December, 1954. The envelope must be clearly marked on the outside—

Tender No. 61

Due 10 a.m., 7th December, 1954.

SCHEDULE

1 Tender No.	2 Company in which the shares are held	3 Share Capital	4 Number of shares offered for sale
61	British Carbo-Norit Union Ltd.	Authorised and Issued 10,000 6% Cumulative Preference shares of £1 each 100,000 Ordinary shares of 6d. each	3996 6% Cumulative Preference Shares of £1 each fully paid 39,960 Ordinary Shares of 6d. each fully paid

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is exempted from the provisions of the Notifications of Vacancies Order, 1952.

A. BOAKE, ROBERTS & CO., LTD., STRATFORD, E.15, require **SENIOR CHEMISTS** for their Process Development Department. These appointments would appeal to qualified men with some years of experience of Organic Chemistry, seeking the opportunity to lead a team in developing new projects from laboratory to plant scale, so as to provide new or improved products. The minimum salary envisaged is £800 per annum.

The Company also requires **ASSISTANT CHEMISTS** to participate in these projects. Industrial chemical experience is desirable in these appointments. Minimum salary is £550 per annum. Applications in detail to **PERSONNEL MANAGER**.

SITUATIONS VACANT

A. BOAKE, ROBERTS & CO., LTD., LONDON, E.15, have the following vacancies at their Stratford factories:—

- 1. DAY CHEMISTS.** Academic or professional qualifications and industrial experience are necessary. Salary not less than £700 per annum.
- 2. SHIFT CHEMISTS.** Candidates should be of graduate standard, with a fair amount of industrial experience. Salary not less than £550 per annum, with additional £50 per annum as shift difference.
- 3. ADMINISTRATIVE ASSISTANTS.** Candidates should hold qualifications not lower than Inter-Science and preferably have had experience in the working of chemical production plant. Salary of the order of £500 per annum, according to qualifications and experience.
- 4. SHIFT LABORATORY TECHNICIANS.** Academic qualifications not essential, but these posts require experience in industrial analysis. Salary according to age and experience: not less than £6 17s. a week at age of 21, with progression.

All these posts offer to the right man ample scope for progress and advancement. Applications, stating at head of letter the post applied for, to

PERSONNEL MANAGER.

**THE UNITED KINGDOM ATOMIC ENERGY
AUTHORITY, ALDERMASTON, BERKS,**

requires
EXPERIMENTAL OFFICERS

or
ASSISTANT EXPERIMENTAL OFFICERS,
as follows:—

POSTS 1 AND 2 (120/WGE/38). To assist in experimental work on the explosive properties of airborne dusts of high explosives. The minimum qualification is Higher School Certificate, but for Experimental Officer a Science Degree or experience of experimental work in a physical or physico-chemical laboratory would be an advantage.

POSTS 3 AND 4 (123/WGE/38). To assist in investigations on the physical and mechanical testings of high explosives, and processing techniques. The minimum qualification is Higher School Certificate (Science) or equivalent. Experience of laboratory work in the field of General Physics would be an advantage and essential for an Experimental Officer post.

The salary scales are:—

Experimental Officer (minimum age 26): £690-£850 (male) per annum.

Assistant Experimental Officer: £276 (at age 18) to £615 per annum.

Houses available within a reasonable period for married staff who live outside the radius of the Establishment's transport facilities.

Application form from
SENIOR RECRUITMENT OFFICER,

A.W.R.E.,

ALDERMASTON, BERKS.

Quote appropriate reference.

**THE POWER-GAS CORPORATION, LIMITED,
STOCKTON-ON-TEES** require **PHYSICAL**

or **INORGANIC CHEMIST** for their Research Laboratories. Candidates should hold a good Honours Degree in Chemistry and preferably be under 30 years of age. Salary dependent on qualifications and experience. Permanent position. Pension Scheme. Apply **STAFF PERSONNEL OFFICER**.

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CHEMIST/TECHNOLOGIST with experience of Rubber Latexes, Dispersions, Adhesives and allied products, is required by a public company in the Manchester area. The successful candidate, who should be of approx. B.Sc. or A.R.I.C. standard, will be required for technical development work in our laboratories and complete liaison with customers. The position provides excellent prospects for someone possessing the necessary experience and personality. Good commencing salary and participation in Staff Bonus and Pension Schemes. Our present staff is aware of vacancy. **BOX NO. C.A. 3556, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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A VACANCY exists for a **MALE LEATHER CHEMIST**, East African Hides, Tanning and Allied Industries Bureau (BCD 97/88/01). Age limit 35 years.

QUALIFICATIONS:
City of London Guild Examination in Leather Technology or B.Sc. Chemistry with Diploma in Leather Manufacture. Previous experience in leather factory or research laboratory.

DUTIES:
Routine leather analyses. Research and tanning processes and preparation of hides and skins.

TERMS OF APPOINTMENT:

Pensionable with salary in the scale £585-£1,320 per annum, plus cost-of-living allowance of 35 per cent of basic salary subject to a maximum of £350 per annum. Outfit allowance, £30. Free passages for officer, wife and children subject to a maximum of three adult passages. Leave at rate of 41 days for each completed month of resident service. Quarters, if available, at rental of 10 per cent of basic salary. Income tax at low local rates.

Apply in writing to the **DIRECTOR OF RECRUITMENT, COLONIAL OFFICE, GREAT SMITH STREET, LONDON, S.W.1**, giving briefly age, qualifications and experience. Mention the reference number (BCD97/88/01).

EXPERIMENTAL OFFICERS AND ASSISTANT EXPERIMENTAL OFFICERS in various Government Departments. The Civil Service Commissioners invite applications for pensionable posts. Applications may be accepted up to 31st December, 1954, but forms should be returned as soon as possible, as an earlier closing date may be announced either for the competition as a whole or in one or more subjects. Interview Boards will sit at frequent intervals.

The posts are divided between following main groups and subjects:—

- (a) Mathematical and Physical Sciences
- (b) Chemistry and Metallurgy
- (c) Biological Sciences
- (d) Engineering Subjects; and
- (e) Miscellaneous (including e.g. Geology, Library and Technical Information Services).

AGE LIMITS.—For Experimental Officers, at least 26 and under 31 on 31st December, 1954; for Assistant Experimental Officers, at least 18 and under 28 on 31st December, 1954. Extension for regular service in H.M. Forces.

Candidates must have at least one of a number of specified qualifications. Examples are: Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University Degree. Candidates taking their examinations in 1954 may be admitted. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general, a higher standard of qualification will be looked for in the older candidates than in the younger ones.

SALARY (London):—

Experimental Officer: £720-£890 (men); £625-£760 (women).
Assistant Experimental Officer: £290 (at age 18) to £845 (men), £545 (women). Starting pay up to £520 (men) or £490 (women) at 26. Somewhat lower outside London. Promotion prospects.

Further particulars and application forms from **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, 30, OLD BURLINGTON STREET, LONDON, W.1**, quoting No. 894-95/34.
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—a rapidly expanding Heavy Chemical Industry—has staff vacancies at its Grimsby (Lincs) and Billingham (Co. Durham) Factories as follows:

TECHNICAL OFFICERS (GRADUATE CHEMISTS AND CHEMICAL ENGINEERS) to assist in the development of Chemical Plant operations. Previous experience of Chemical Plant work would be useful but is not essential.

ASSISTANT TECHNICAL OFFICERS

with qualifications up to Inter. B.Sc. standard, and experience in Chemical Plant operations.

Applicants should preferably be under 30 years of age. Conditions of work and service are very attractive and there are Staff Bonus and Superannuation Schemes. Commencing salary dependent on age, qualifications and experience.

Application forms may be obtained from the **PERSONNEL MANAGER, BRITISH TITAN PRODUCTS COMPANY, LIMITED, KRONOS HOUSE, COPPERGATE, YORK.**

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CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE 3285 EAST.**

DEVIL DISINTEGRATOR, "Hardy Patent Pick Co."

Grinding chamber approx. 30 in. diam., pulley 8 in. diam. by 6 in. face.
One Ditto. Grinding Chamber 22 in. diam., pulley 8 in. diam. by 3 in. face.

GRAVITY ROLLER CONVEYOR—24 in. rolls, 12 n. to 18 in. wide, 3 in. to 6 in. pitch, in various lengths. Good condition.

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"MORWARD" "U"-shaped **TROUGH MIXERS** up to 2 tons in s.s. or m.s. with agitators, scroll or paddle type, jacketed or unjacketed.

S.S. TROUGHS, tanks and cylinders made to requirements.

2 TILTING TROUGH MIXERS, 25 and 50g. by **RICHMOND and CHANDLER**, double 'Z' blades, with or without jacket, s.s. interior, 50g. 75g. and 100g. heavy duty **MIXERS by FALLOWS and BATES**, agitators driven through bevel gears from fast and loose pulleys.

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200g. c.i. JACKETED MIXING VESSEL with nickel chrome impeller type agitator driven through bevel gears from fast and loose pulley.

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Two Steam-jacketed **CAST-IRON FILTER PRESSES**, each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.

Several Johnson **CAST-IRON FILTER PRESSES**, various sizes and types.

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SUITABLE for Rubber, etc., Lining 30 ft. by 8 ft. dia., Plate thickness 1 in. Also 3-30 ft. by 7 ft. dia.

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COMPLETE VACUUM DRYING PLANT, by Scott, comprising two horizontal cylindrical jacketed driers, each approx. 8 ft. long by 42 in. i.d. Interior tinned and fitted agitator in glanded bearings. Motorised 400/3/50, through reduction gearbox. With two horizontal Scott wet vacuum pumps, condenser, calorifier, hot water pump, and water circulating tank, driers provided with common feed hopper with breeches outlet.

TEN NEW ESCHER-WYSS SYSTEM TWIN-ROLL SPRAY DRIERS. Rolls of chilled cast iron 40 in. long by 32 in. diam., for maximum 74 lb./sq. in. w.p., fitted air-cooled doctor blades, rotary disc distribution trough, air spray jets and worm discharge conveyors. Ancillary equipment comprises stainless steel feed pump, jacketed feed tank, aluminium encased powder dresser, valves and gauges.

STEAM-HEATED TWO-COMPARTMENT DRYING OVEN by Mitchell. i.d. 6 ft. by 3 ft. wide by 6 ft. high, to accommodate two four-wheel trolleys 3 ft. by 32 in., containing 15 steel shelves at 4 in. spacing. Counter-balanced doors back and front of oven. Motorised air circulating fan, exhaust system with trunking. Complete with steam fittings. Temperature 20-120°C.

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NEW WET AND DRY HORIZONTAL VACUUM PUMP, type P.N.6, single-stage, double-acting type. Capacity approx. 200 cu. ft. per min. displacement at speed 125 r.p.m. Fitted outboard bearing with driving pulley, approx. 12 h.p. required to drive.

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JACKETED RECTANGULAR VACUUM OVEN—8 ft. by 3 ft. 6 in. by 4 ft.

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WE INVITE BEST OFFERS FOR—

50 tons Crude Paraffin.
20 tons Montan Wax.
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10 tons Potassiumchlorate.
5 tons Anilin Oil.
3 tons Sodium Sulphite.
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Which are available for disposal ex stock. All enquiries to **BOX NO. C.A. 3360, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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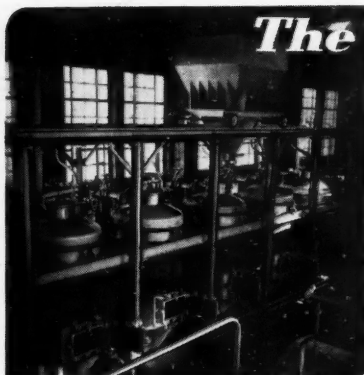
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